

The Role of Elaboration in Self-Control

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy  
in the Graduate School of The Ohio State University

By

Jennifer Nicole Belding

Graduate Program in Psychology

The Ohio State University

2015

Dissertation Committee:

Richard Petty, Advisor

Kentaro Fujita

Duane Wegener

Copyrighted by  
Jennifer Nicole Belding  
2015

## Abstract

People can exert self-control in effortful and non-effortful ways. While some research suggests that low thinking hinders self-control, other research indicates that cognitive resources are not necessary for self-control. Unfortunately, only very few theories articulate the conditions under which careful deliberation is helpful or harmful for effective self-control. To answer this question, we draw on research from the attitudes and persuasion literature and suggest that both the direction and amount of thinking are important for understanding when people will exert self-control. We argue that the experience of a self-control conflict can be conceptualized as an exercise in self-persuasion in that people can thoughtfully persuade themselves to indulge or forgo indulgence. Furthermore, because elaboration increases attitude strength, preferences formed under high elaboration conditions should be more impactful (i.e., resistant to change and predictive of behavior) than those formed under low elaboration conditions. In five studies, participants were randomly assigned to read or generate either goal-inconsistent or goal-consistent thoughts under either high or low elaboration conditions using both dieting and financial self-control conflicts. We hypothesized that elaboration is beneficial for self-control when one has elaborated upon goal-consistent thoughts, but can backfire when one has elaborated upon goal-inconsistent thoughts.

## Dedication

This dissertation is dedicated to my fiancé, Christopher Martin, who has both supported and challenged me to defend my ideas for the past ten years even from afar.

## Acknowledgments

I would like to thank my advisors, Richard E. Petty and Kentaro Fujita, for their patience and intellectual support at all stages of this research. I would also like to thank Pablo Briñol, Duane Wegener, and all of the members of the Attitudes and Persuasion Lab (Steven Bengal, Geoff Durso, Jeremy Gretton, Luke Hinsenkamp, India Johnson, Brandon Kopp, Andy Luttrell, Mike McCaslin, Kathleen Patton, Vanessa Sawicki, Brittany Shoots-Reinhard, Jake Teeny, Ben Wagner, & Laura Wallace) and the Motivation and Cognitive Science Lab (Elise Bui, Jessica Carnevale, Mo Craig, Nikki Dusthimer, Micah Goldfarb, Sara Greaves, Long Ha, Hyojin Lee, Shuqi Li, Karen MacGregor, Janet Rha, Ian Roberts, Joe Roberts, Jo Sasota, Paul Stillman, Mary Kate Tompkins, Pin-ya Tseng, & Will Schiavone) at Ohio State for their support, patience, and helpful feedback on this research.

## Vita

May 2005 .....Chattahoochee High School

2008.....B.S. in Psychology, Georgia Southern  
University

2009-2010 .....Graduate Fellow, Department of  
Psychology, The Ohio State University

2010-2011 .....Graduate Research Associate, Department  
of Psychology, The Ohio State University

2011.....M.A. in Psychology, The Ohio State  
University

2011-2015 .....Graduate Teaching Associate, Department  
of Psychology, The Ohio State University

## Publications

- Belding, J.N., Naufel, K.Z., & Fujita, K. (In Press). Using high-level construal and perceptions of changeability to promote self-change over self-protection motives in response to negative feedback. *Personality and Social Psychology Bulletin*.
- Beers, M., Belding, J., & Mehling, M. (2014). Principles and practices of graduate TA training at The Ohio State University. In J.N. Busler, B.C. Beins, & W. Buskist (Eds.), *Preparing the new psychology professoriate: Helping graduate students become competent teachers* (2<sup>nd</sup> ed.).
- Belding, J.N., Howard, M.G., McGuire, A.M., Schwartz, A.C., & Wilson, J.H. (2010). Social buffering by God: Prayer and measures of stress. *Journal of Religion & Health*, 49(2), 179-187.

## Fields of Study

Major Field: Psychology

## Table of Contents

Abstract .....	ii
Dedication .....	iii
Acknowledgments.....	iv
Vita.....	v
List of Figures .....	ix
Chapter 1: Introduction .....	1
Chapter 2: Study 1 .....	14
Chapter 3: Study 2 .....	20
Chapter 4: Study 3 .....	27
Chapter 5: Study 4 .....	32
Chapter 6: Study 5 .....	42
Chapter 7: Combined Analyses for Studies 2, 4 & 5 .....	50
Chapter 8: Discussion .....	53
References .....	59
Appendix A: Persuasive Messages .....	68



Appendix B: Figures .....	70
Appendix C: Study 2 Supplementary Analyses.....	88
Appendix D: Study 4 Supplementary Analyses.....	91
Appendix E: Study 5 Supplementary Analyses .....	93
Appendix F: Combined Studies 2, 4, & 5 Supplementary Analyses .....	96

## List of Figures

Figure 1. Preferences as a function of elaboration and message in Study 1. Error bars represent standard error of the mean.....	70
Figure 2. Perceived strength (i.e., resistance to change and certainty) of preferences as a function of elaboration and message in Study 1. Error bars represent standard error of the mean.....	71
Figure 3. Subsequent preferences as a function of initial preferences and elaboration in Study 2. ....	72
Figure 4. Subsequent preferences as a function of elaboration and thought direction order in Study 2. ....	73
Figure 5. Candy choice as a function of elaboration and thought direction order in Study 3.....	74
Figure 6. Subsequent preferences as a function of elaboration and thought direction order in Study 4. ....	75
Figure 7. Subsequent preferences as a function of initial preferences, elaboration, and relevance in Study 4.....	76
Figure 8. Subsequent preferences as a function of elaboration, thought direction order, and relevance in Study 4. ....	77

Figure 9. Subsequent preferences as a function of initial preferences and elaboration in Study 5. ....	78
Figure 10. Subsequent preferences as a function of elaboration and thought direction order in Study 5.....	79
Figure 11. Subsequent preferences as a function of initial preferences and elaboration in Studies 2, 4, and 5. ....	80
Figure 12. Subsequent preferences as a function of elaboration and thought direction order in Studies 2, 4, and 5. ....	81
Figure 13. Preferences as a function of elaboration, thought direction order, and time of measurement in Study 2.....	82
Figure 14. Average preferences over time as a function of elaboration and relevance in Study 4. ....	83
Figure 15. Preferences as a function of elaboration, thought direction order, and time of measurement in Study 5.....	84
Figure 16. Preference change as a function of elaboration and thought direction order in Study 5. ....	85
Figure 17. Preferences as a function of elaboration, thought direction order, and time of measurement in Studies 2, 4, and 5.....	86
Figure 18. Preference change as a function of elaboration and thought direction order in Studies 2, 4, and 5. ....	87

## Chapter 1: Introduction

Self-control failures, like choosing to eat unhealthy M&Ms instead of healthy grapes when one is on a diet, are common. Although failing to exert self-control once in a while is not detrimental, repeated failures can be costly. For example, repeated self-control failures in the dieting domain alone may dramatically increase the rate of obesity in the United States, ultimately costing Americans an estimated \$147 billion dollars per year (Finkelstein, Trogon, Cohen & Dietz, 2009).

Self-control failures occur when people choose a short-term temptation over a long-term goal when they desire both options. Understanding why and how people fail to exert self-control in single or repeated instances has received much attention in social psychological research (see Baumeister & Heatherton, 1996; Metcalfe & Mischel, 1999; Trope & Fishbach, 2005). Whereas some research suggests that successful self-control is the result of effortful inhibition of impulses (e.g., Baumeister & Heatherton, 1996; Metcalfe & Mischel, 1999; Hofmann, Friese & Strack; 2009), other research argues that self-control can take many effortful and non-effortful forms (see Fujita, 2011). How people both thoughtfully and non-thoughtfully resolve self-control conflicts is thus an area of great interest.

One particularly prominent area of research on self-control is that which considers the consequences of being relatively thoughtful versus relatively thoughtless when confronting a short-term temptation. In understanding how people can resolve self-control conflicts, many scholars consider a dual systems perspective (e.g., Kahneman & Frederick, 2002; 2005). Dual systems researchers argue that people can use one of two systems, the reflective system or the impulsive system, to guide behavior. In general, the reflective system utilizes careful thought and prompts behavior that is both feasible and desirable. The impulsive system, on the other hand, uses accessible impulses and affect to guide behavior.

When applied to self-control, research on dual systems suggests that System 1 (the impulsive system) often leads people to experience a self-control failure and indulge in the temptation (e.g., Hofmann, Friese, & Strack, 2009; Shiv & Fedorikhin, 1999; 2002; Strack & Deutsch, 2004). In this sense, the presence of a temptation prompts the impulse to pursue a behavioral choice that is inconsistent with and harmful to one's long-term goal. System 2 (the reflective system), on the other hand, allows people to carefully consider their long term goals and thus avoid the temptation (see Hofmann, Friese, & Strack, 2009).

In general, a dual-systems perspective suggests that impulses, which are almost always pro-temptation by definition, guide behavior when cognitive resources are limited by a range of factors including cognitive load, time pressure, low working memory capacity, ego depletion, etc. (see de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012; Hofmann, Friese, & Strack, 2009). The predictions of dual system

approaches bear at least a surface similarity to earlier theories in social psychology (e.g., Petty & Cacioppo, 1986) which held that salient simple cues guided judgment and behavior when motivation and/or ability to think were low but the more global merits of objects were considered when thinking was high (e.g., Petty & Cacioppo, 1986; see Chaiken & Trope, 1999; Sherman, Gawronski, & Trope, 2014, for reviews of a variety of approaches). Consistent with these dual process and system approaches, research on the role of working memory capacity (WMC) in self-control suggests that individuals with high WMC, who are inherently more able to deliberate carefully (or use the reflective system), are better able to pursue their long-term goals because they can inhibit automatic reactions to simple cues that would otherwise guide people to indulge in a short-term temptation (e.g., Hofmann, Gschwendner, Friese, Wiers & Schmitt, 2008).

Similarly, research on the role of affect and cognition in self-control suggests that positive affect, typically aroused by the presence of a short-term temptation such as an immediately available chocolate cake for dieters, guides behavior when cognitive processing resources are limited (e.g., Shiv & Fedorikhin, 1999). According to this perspective, when processing resources are limited, the dieter cannot inhibit the impulse to indulge and is therefore likely choose the chocolate cake over a healthier fruit salad (Shiv & Fedorikhin, 1999). Importantly, subsequent research suggested that having cognitive resources is necessary but not sufficient for impulse inhibition. For example, if one's processing resources are abundant and the temptation is physically present, the positive affect evoked by the temptation may still prompt indulgence (Shiv & Fedorikhin, 2002). In general, however, this research suggests that cognitive resources are helpful in

exerting self-control, but they alone are not a guarantee for effective self-control. In sum, a dual process or systems perspective on self-control has been used to suggest that one must think carefully about the conflict in order to act in accordance with one's long-term goals and that lack of careful thought will often cause self-control failure (see Hoffman et al., 2009).

It is important to note, however, that although the effortful inhibition of impulses can be enhanced when cognitive resources are available, some research suggests that people can pursue their long-term goals automatically without extensive and available cognitive resources, even when those goals conflict with a desirable short-term temptation (for a review, see Sheeran, Gollwitzer, & Bargh, 2013). For example, research on automatic goal pursuit suggests that people can pursue their long-term goals with little to no deliberative processing (e.g., Ferguson & Bargh, 2004; Fishbach, Friedman, & Kruglanski, 2003; Fishbach & Shah, 2006; Young & Fazio, 2013), particularly when behaving in line with one's goals is well practiced (e.g., Maddux, Barden, Brewer, & Petty, 2005). Similarly, habits tend to guide behavior when cognitive resources are limited but may promote either self-control success or failure depending on the nature of the habit (e.g., Neal, Wood, & Drolet, 2013; Ouellette & Wood, 1998; Wood, Labrecque, Lin, & Ruenger, In Press).

As just reviewed, considerable research has focused on how the amount of thinking one does when confronted with a self-control conflict can influence goal pursuit. Furthermore, although much previous research suggests that low thinking conditions can hinder effective self-control, other research argues that people do not require cognitive

resources to effectively pursue their long-term goals if these goals are highly accessible or goal-consistent behaviors are habitual. Unfortunately, only very few theories articulate the conditions under which careful deliberation is helpful or harmful for effective self-control. In order to address this question, we draw on research from the attitudes and persuasion literature. We suggest that both the direction of one's thoughts and the amount of thinking are important for understanding when people will successfully exert self-control.

Particularly important for our analysis, prior work on self-control has only examined the role of thinking at the time of the choice. However, it is possible for people to anticipate a choice requiring self-control long before being directly confronted with that choice. That is, people can anticipate experiencing a self-control conflict and think about what to choose in advance, whether those thoughts favor indulgence or long term goal-consistent behavior. Thinking, therefore, need not occur at the time of conflict. We argue that people can think about both reasons to indulge or forego indulgence before ever being confronted with the choice itself and that this prior thought can be consequential for the choice made at the time of conflict. Specifically, because elaboration (thinking) increases the strength of one's attitudes (see Petty & Krosnick, 1995), we hypothesize that the more people elaborate on the merits of a choice prior to that choice, the stronger their preferences will be, which may ultimately influence their behavior. That is, if one elaborates or thinks carefully about an option prior to experiencing the conflict, the preferences developed as a result of that thinking should be more likely to influence behavior when one must choose between short-term temptations



and long-term goals. To this end, the primary goal of the current research is to show that careful thought in advance of a choice can promote either self-control success or failure depending on the direction of one's thoughts because elaboration strengthens one's preferences.

### *An Attitudinal Perspective on Self-Control Conflicts*

A self-control conflict, or a dual motive dilemma between a short-term temptation and a long-term goal, presupposes positive attitudes towards both the goal and the temptation. In this kind of conflict, choosing to indulge in a short-term temptation and pursuing one's long-term goals are mutually exclusive. By choosing to indulge in a temptation, one is, by definition, harming his or her long-term goal. Similarly, by forgoing indulgence, one is pursuing his or her long-term goal although such action requires rejecting the positively valued and immediately available temptation. Thus, in attitudinal terms, a self-control conflict assumes attitudinal ambivalence toward both the short-term temptation and the long-term goal. The short-term temptation has positive qualities but is negative in that it conflicts with the desired long-term goal. Similarly, one may value the long-term goal but it is also negative in that it conflicts with the positive qualities of the short term temptation.

When one is confronted with the choice between the temptation and the goal, prior thinking could either be good or bad for self-control. That is, an attitudinal perspective would suggest that one ought to consider not only how much people are thinking, but also the direction or content of the person's thoughts. For example, the Elaboration Likelihood Model of persuasion holds that prior thought about the positive

features of the long term goal would increase the likelihood of subsequent self-control success whereas prior thought about the positive features of the short term temptation would increase the likelihood of subsequent self-control failure because elaboration increases the likelihood of attitude-consistent action (Petty & Cacioppo, 1986; Petty & Wegener, 1999). In a related vein, the Motivation and Opportunity as DEterminants (MODE) model of attitude-behavior relations (Fazio, 1990) suggests that one's automatically activated attitudes are more influential in predicting behavior when cognitive resources are limited, as Hofmann and colleagues show (Hofmann, et al., 2008). However, when cognitive resources are available, one's more thoughtfully generated attitudes are more influential in predicting behavior (e.g., Fazio, 1990).

Thus, if a dieter is confronted with the decision to eat the chocolate cake and her cognitive resources are limited, the accessibility of her positive or negative attitude towards the cake will guide her behavior. If her first reaction, as we expect in most cases, is "Yum," then she will likely eat the cake, which is consistent with the previously mentioned work on dual systems and self-control. However, if her first reaction is "Ew," then she will likely not eat the cake even if processing resources are limited. Thus, merely knowing that a dieter's cognitive resources are constrained is not sufficient to suggest that she will indulge. To make this claim, one must assume that the dieter's attitudes towards the temptation are positive and highly accessible, as they often will be. Linking these two approaches is the notion that careful prior thinking about the positive or negative features of the temptation or the long-term goal will increase the accessibility of the relevant attitude rendering it more useful in guiding behavior whether thinking at

the time of choice is high or low (see Petty & Briñol, 2014; Petty, Haugtvedt, & Smith, 1995).

Because of the important role that prior thought plays in the current conceptualization, it is important to consider the direction of one's thoughts when examining whether people will indulge or forgo indulgence at the time of choice. If there is ample opportunity to think at the time of choice, one can construe the experience of a self-control conflict as an exercise in self-persuasion. That is, people can thoughtfully persuade themselves to choose one option (either short-term temptation or long-term goal) over the other. For instance, a dieter may unsurprisingly be able to spontaneously generate reasons why she should choose not to eat the chocolate cake. After all, she has chosen to be on a diet and the cake is presumably against that diet. These goal-consistent thoughts are akin to what Shiv and Fedorikhin (1999; 2002) suggest occurs when one has cognitive processing abilities and is not distracted by the physical allure of the immediately available chocolate cake. However, it is also possible for this same dieter to spontaneously generate reasons why she is justified in eating the chocolate cake. For example, the cake is beautiful and delicious, she has worked hard on a manuscript all day, and cake really isn't that unhealthy for her if she doesn't eat too much. Such thoughts can produce the same result as the higher-order affect that influences one's choice when processing resources and the temptation are both immediately available (Shiv & Fedorikhin, 2002).

Similarly, research from marketing on the licensing effect in consumer choice also portrays the idea that people can thoughtfully choose to indulge in a temptation, even

at the expense of their long-term goals, after performing a positive action, like committing to pick up litter (e.g., Khan & Dhar, 2006). Although often underrepresented in the current self-control literature, this process of persuading oneself to indulge in a thoughtful manner at the time of choice is quite possible. Therefore, merely knowing that a dieter is both motivated and able to think about the conflict at the time of choice is not sufficient to suggest that he or she will resist indulgence. To make this claim, one must assume that the dieter's thoughts are consistent with one's long-term goal (i.e., against the short-term temptation and/or in favor of the long-term goal).

Although knowing only the amount of thinking one may do when confronted with a self-control conflict may not be sufficient to determine whether one will succeed or fail at self-control, it may allow insight into how a single self-control conflict can affect future self-control outcomes. That is, as noted above, previous research in the attitudes domain suggests that high (relative to low) prior thinking causes attitudes to be more predictive of subsequent behavior, stable over time, and resistant to change when attacked (Petty & Krosnick, 1995; see Petty, Haugtvedt, & Smith, 1995, for a review). Therefore, one might expect that prior elaboration on thoughts consistent with one's long-term goal will encourage those who are conflicted to exert self-control both at the time of thinking and beyond. Similarly, prior elaboration on goal-inconsistent thoughts will encourage conflicted individuals to indulge both at the time of thinking and beyond. That is, prior careful thought about short-term temptations as well as long-term goals can cause people to be successful or unsuccessful both at the time of thinking and in the future.

### *Prior Research on Elaboration and Attitude-Consistent Action*

As just mentioned, previous work on attitudes and persuasion has demonstrated that elaboration increases the likelihood that people will act in attitude-consistent ways. In short, elaboration increases the strength of people's attitudes (see Petty, Haugtvedt, & Smith, 1995, for a review). As a result, these attitudes become more persistent over time, resistant to change, and predictive of behavior (see Petty & Krosnick, 1995). Whereas persistence and resistance are similar in that both imply attitude stability, only the latter refers to stability in the face of an explicit attack.

Research on resistance to attitude change as a function of elaboration, therefore, often uses persuasion paradigms in which a first message is processed under conditions of high or low elaboration and then an attacking message is received (e.g., see Wegener, Petty, Dove, & Fabrigar, 2004, for a review). That is, participants typically first read a persuasive message arguing for one position (e.g., in favor of senior comprehensive exams) under conditions of high or low thinking, report their attitudes, read a persuasive message arguing the opposite position (e.g., against senior comprehensive exams), and report their attitudes a second time. Attitudes formed following the first message are considered resistant to the extent that the position taken in the second message does not influence subsequent attitudes. In these paradigms, researchers typically expect that initial attitudes (i.e., those measured after the first message but before the attack message) will be consistent with the first message regardless of the amount of initial thinking. This is because the messages used in these studies typically employ both strong arguments and positive simple cues so that attitude change after the first message will be comparable

whether people process the message carefully or not (e.g., see Haugtvedt & Petty, 1992). However, the attack message should have a greater impact on subsequent attitudes when the initial attitude is weaker (i.e., formed under low thinking conditions) rather than stronger (i.e., formed under high thinking conditions; Petty & Cacioppo, 1996).

In one empirical demonstration of these effects, Haugtvedt and Wegener (1994) had participants read persuasive messages about senior comprehensive exams and measured their attitudes. Participants read the pro-exams message first and the counter-exams message second or vice versa. Furthermore, participants were randomly assigned to high or low elaboration conditions for the first message using a manipulation of personal relevance (Petty & Cacioppo, 1979). The results indicated that elaboration increased resistance to change because participants' attitudes following the second message reflected the first message they read when those initial attitudes were formed under high elaboration, but those in the low elaboration condition reflected the second message they read. That is, participants in the high elaboration condition demonstrated a primacy effect whereas those in the low elaboration condition demonstrated a recency effect (Haugtvedt & Wegener, 1994; see Haugtvedt & Petty, 1992, for a similar result).

In addition to increasing resistance to change, elaboration also increases attitude-behavior consistency (e.g., Petty, Cacioppo, & Schumann, 1983; Sivacek & Crano, 1982). In these and similar studies, the correlation between attitudes and behavioral intentions was stronger when initial attitudes were formed with high relative to low elaboration. For example, participants who had positive attitudes towards senior comprehensive exams were more likely to intend to sign a petition in favor of the exams

when they elaborated on a persuasive message (containing strong arguments) compared to those who did not. Recent meta-analyses on attitude-behavior consistency have also confirmed these effects for both behavioral intentions and actual behaviors (see Glasman & Albarracín, 2006).

Thus, the previous work on attitude strength suggests that elaboration increases both resistance to change and attitude-behavior consistency. Elaboration also increases various attitude strength indicators that can mediate these consequences such as attitude accessibility (e.g., Priester & Petty, 2003) and attitude certainty (e.g., Barden & Petty, 2008). The goal of the current research is to apply these insights to self-control conflicts. For example, consider people who have positive attitudes towards M&Ms. A person who has previously elaborated on his positive attitude towards M&Ms will be more likely to behave accordingly in a subsequent situation by choosing to purchase and eat M&Ms compared to someone who possesses the same attitude but has formed that attitude with relatively less elaboration. Furthermore, the pro-M&M attitudes formed with relatively high (vs. low) elaboration should be more resistant to change even in the face of a friend attempting to convince him or her that M&Ms are unhealthy. Of course, the opposite is predicted for individuals who have previously elaborated on a negative attitude toward M&Ms.

### *The Present Research*

In the present research, we build on prior work on attitude strength to examine how elaboration can facilitate or hinder self-control. In five studies, participants were randomly assigned to read or generate either long-term goal-inconsistent thoughts (e.g.,

chocolate is tasty) or goal-consistent thoughts (e.g., chocolate is unhealthy) under either high or low elaboration conditions using both dieting (Studies 1-4) and financial (Study 5) self-control conflicts. For each study, the key hypothesis is that elaboration is beneficial for self-control when one has elaborated upon long term goal-consistent thoughts, but can backfire when one has elaborated upon long-term goal-inconsistent thoughts.

More specifically, it is predicted that goal-relevant preferences formed under high relative to low elaboration are more resistant to change over time and predictive of behavior. We hypothesize that goal-relevant preferences formed under high elaboration conditions are more likely to resist change in the face of an attack message than those formed under low elaboration conditions. We also hypothesize and show that these results occur more for those for whom the choice represents a conflict (e.g., dieters) than for those who are not conflicted (e.g., non-dieters, Study 4). These results suggest that prior careful thinking about one's temptations and goals can be either beneficial or harmful for long-term goal pursuit depending on the content of one's thoughts. In the first study, perceptions of resistance to change are examined as a proxy for actual resistance, but in the subsequent studies, either actual resistance or behavioral choices are examined.



## Chapter 2: Study 1

Study 1 was designed to provide a preliminary examination of the potential role of elaboration in self-control. First, it was hypothesized that the direction of one's thoughts would influence food preferences initially regardless of the initial level of elaboration. Second, and more importantly, when participants elaborated on their initial food-relevant thoughts, they should perceive their thought-based preferences to be stronger (i.e., more resistant to change, held with more certainty) than those who did not elaborate on their thoughts. Prior research has shown that measures of perceived strength (e.g., perceived resistance) show a pattern similar to actual strength (e.g., Briñol, Rucker, Tormala, & Petty, 2004; Tormala & Petty, 2002).

### Method

#### *Participants and Design*

One hundred twenty undergraduate introductory psychology students at The Ohio State University were randomly assigned to the cells of a 2 (elaboration: low vs. high) x 2 (message: pro-chocolate vs. anti-chocolate) between participants factorial design. Participants received partial course credit for engaging in the study. Four participants

were excluded for failing to follow directions (see Oppenheimer, Meyvis, & Davidenko, 2009), leaving a final  $N$  of 116.<sup>1</sup>

### *Procedure*

Upon entering the laboratory, participants sat at one of 11 partitioned computer stations and were told that they would complete a study on memory under distraction. After providing informed consent, participants were randomly assigned to remember a number while reading a persuasive message about chocolate. After reporting their assigned number, participants were told that the experimenter was considering conducting much longer studies on memory in the future and they were asked about their snack preferences for such a study as well as the strength of those preferences.

### *Independent Variables*

*Elaboration.* Participants were randomly assigned to remember either a seven (low elaboration) or two (high elaboration) digit number while reading a message about chocolate (a standard induction of cognitive load; see Gilbert & Osborne, 1989). Then, they reported their thoughts about the message and answered filler questions to enhance the cover story. Participants were explicitly told that the primary purpose of this task was to remember their assigned number. Participants reported their number, thus ending the elaboration manipulation, before answering any of the core dependent measures described below.

---

<sup>1</sup> Approximately halfway through the experiment, participants read, "If you are reading this question, please choose answer 3." Participants who responded to this question with a response other than 3 were excluded for failure to follow directions. We apply these same exclusionary rules to all of the laboratory studies in this manuscript and note the number of participants excluded.

*Message.* While remembering their number, participants were asked to read a message containing five arguments either in favor of or against eating chocolate (see Appendix A). In both conditions, participants read that chocolate was developed from the cocoa bean and has its roots in the Central Americas. Participants in the pro-chocolate condition then read that chocolate has several desirable features (e.g., “Foods with chocolate are often sweet and pleasant,” “Chocolate may elevate mood because of the release of endorphins in the brain”). Participants in the anti-chocolate condition read the same basic description of chocolate, which was followed by several undesirable features of chocolate (e.g., “Foods with chocolate are often high in saturated and trans fat,” “Chocolate may be addictive because of the release of dopamine in the brain”).<sup>2</sup>

#### *Dependent Variables*

*Preferences.* After answering several filler measures and reporting their memorized number, participants were asked to consider a hypothetical choice between carrots and chocolate chip cookies. Participants’ preferences toward choosing one or the other food item were assessed by asking them to, “Please mark on the following scale how much you would like EITHER the chocolate chip cookies OR the carrots” (1 = extremely prefer chocolate chip cookies, 7 = extremely prefer carrots). This item was

---

<sup>2</sup> In order to ensure that these messages successfully influenced participants’ thoughts, we recruited a sample of 74 undergraduate students from the same population as Study 1 and asked them to read either the pro-chocolate message or the anti-chocolate message and report their thoughts about chocolate. Two research assistants who were blind to experimental condition coded participants thoughts as being pro-chocolate (1), neutral (0), or anti-chocolate (-1). The research assistants agreed on 92% of trials and discrepancies were resolved through discussion. The proportion of thoughts that were in favor of eating chocolate was calculated as the dependent measure. As expected, participants who read the pro-chocolate message ( $M = 0.50$ ,  $SD = .58$ ) had more favorable thoughts about chocolate than those who read the anti-chocolate message ( $M = 0.13$ ,  $SD = .78$ ),  $t(72) = 2.32$ ,  $p = .02$ ,  $d = .55$ .

reverse coded such that higher numbers indicate that participants favor the item with chocolate more than the item without chocolate.

*Preference Strength.* The subjective strength of participants' preferences was assessed next by asking participants to report, "How easy would it be to change your mind and choose the other option?" (1 = Not at all easy, 9 = Very easy) and "How certain are you of the choice you just made?" (1 = Not at all certain, 9 = Very certain). These items were coded such that higher numbers indicate greater perceived strength.

### Study 1 Results

*Elaboration Manipulation Check.* The data were first examined to ensure that participants were correctly able to recall their assigned number. As expected, all participants in the low load condition ( $n = 55$ ) were able to recall the two-digit number and the majority of participants in the high load condition ( $n = 55$ , 84.6%) were able to recall the seven-digit number. All participants who misremembered their seven-digit number were able to recall between five and seven of the digits correctly. Furthermore, to examine whether the manipulation of cognitive load significantly influenced elaboration, the number of thoughts participants generated were analyzed using a 2 (Elaboration: Low vs. High) x 2 (Message: Anti-Chocolate vs. Pro-Chocolate) ANOVA. Contrary to our expectations, the manipulation of elaboration did not influence the number of thoughts that participants reported,  $F(1, 116) = 0.02$ ,  $p = .89$ ,  $d = .00$ . Due to a computer programming error, it is not possible to examine whether the manipulation of elaboration influenced the number of words within participants' thoughts.

*Preferences.* A 2 (Elaboration: Low vs. High) x 2 (Message: Anti-Chocolate vs. Pro-Chocolate) ANOVA was conducted on participants' preferences between carrots and chocolate chip cookies. The grand mean for this dependent variable was 5.22 ( $SD = 1.56$ ), which suggests that participants were more inclined to select the chocolate chip cookies than the carrots. There was a significant main effect of elaboration on preferences,  $F(1, 112) = 3.62, p = .06, d = .35$ , such that those in the high elaboration condition ( $M = 5.53, SD = 1.48$ ) preferred the chocolate chip cookies more than those in the low elaboration condition ( $M = 4.97, SD = 1.60$ ), which suggests that the more participants were able to think about the message about chocolate (regardless of direction), the more they wanted the indulgent option. Perhaps this is because the message on chocolate made pre-existing positive attitudes toward chocolate more salient. Furthermore, there was also a significant effect of message on preferences,  $F(1, 112) = 3.62, p = .06, d = .36$ , such that those who read the pro-chocolate message ( $M = 5.53, SD = 1.45$ ) wanted the chocolate chip cookies more than those who read the anti-chocolate message ( $M = 4.97, SD = 1.62$ ). These results support our hypothesis that the direction of one's thoughts can significantly influence preferences. These main effects were not qualified by a significant interaction between elaboration and message,  $F(1, 112) = 0.65, p = .42, \eta^2_{partial} = .006$  (see Figure 1).<sup>3</sup>

---

<sup>3</sup> Previous research on persuasion could lead one to expect an interaction between elaboration and thought direction (e.g., Petty & Cacioppo, 1979). Because the focus of the present manuscript is on the hypothesis that elaboration increases resistance to change, the messages in this study included both strong arguments and positive cues in the each message which can render attitudes equally favorable regardless of extent of elaboration (e.g., see Haugtvedt & Petty, 1992).

*Preference Strength.* Next, the strength of participants' preferences was analyzed. Because the two items were significantly correlated,  $r(116) = .40, p < .001$ , they were averaged to form an index of preference strength.<sup>4</sup> As expected, there was a significant main effect of elaboration on preference strength,  $F(1, 112) = 7.32, p = .008, d = .25$ , such that preferences were stronger for those in the high elaboration condition ( $M = 6.70, SD = 1.54$ ) relative to those in the low elaboration condition ( $M = 5.84, SD = 1.80$ ). This main effect was not accompanied by a significant effect of message or the interaction term,  $F(1, 112) = 0.38, p = .54, d = .06$  and  $F(1, 112) = 0.14, p = .71, \eta^2_{partial} = .001$ , respectively (see Figure 2).

Broadly speaking, these findings suggest that processing of a persuasive message about chocolate affected snack preferences regardless of whether that processing was under high or low cognitive load, as intended. However, the extent of processing, as varied by load, affected the perceived strength of the preference as measured by the certainty of the preference and perceptions of how difficult it would be to change the preference.

---

<sup>4</sup> Results analyzing these items separately yielded similar results. There was a significant main effect of elaboration on perceived resistance,  $F(1, 112) = 6.27, p = .01, d = .23$ , such that those in the high elaboration condition ( $M = 5.58, SD = 2.44$ ) believed that it would be harder to go back and change their mind than those in the low elaboration condition ( $M = 4.44, SD = 2.38$ ). This main effect was not accompanied by a significant effect of message or the interaction term,  $F(1, 112) = 0.27, p = .61, d = .05$ , and  $F(1, 112) = 0.27, p = .61, \eta^2_{partial} = .002$ , respectively. Furthermore, there was a marginally significant effect of elaboration on preference certainty,  $F(1, 112) = 3.61, p = .06, d = .18$ . Participants in the high elaboration condition ( $M = 7.81, SD = 1.78$ ) were more certain of their preferences than those in the low elaboration condition ( $M = 7.24, SD = 1.92$ ). This main effect was also not accompanied by a significant effect of message or its interaction with elaboration,  $F(1, 112) = 0.26, p = .61, d = .05$ , and  $F(1, 112) = 0.00, p = .99, \eta^2_{partial} = .00$ , respectively.

### Chapter 3: Study 2

Study 1 demonstrated that not only did the direction of one's initial thoughts influence preferences, but also that elaboration increased the subjective strength of those preferences. Study 2 was designed to extend these findings. Because carrots and chocolate chip cookies were not equivalent in desirability for participants in Study 1, in Study 2 participants made a choice between grapes and M&Ms, two closer alternatives. Additionally, Study 2 was designed to determine if high elaboration increases the objective strength of one's preferences by measuring actual rather than perceived resistance to change. Otherwise, the procedure was similar to Study 1. That is, the design was a 2 (elaboration: low vs. high) x 2 (message order: pro-chocolate first vs. anti-chocolate first) between subjects factorial. The key measure was preference for a chocolate or non-chocolate item taken after the first and second message.

Preferences at time 2 were analyzed as a function of preferences at time 1, elaboration, and message order. Two interactions were predicted. First, elaboration was predicted to interact with initial preferences to predict subsequent preferences such that initial preferences would predict subsequent preferences better under high than low elaboration conditions. Second, elaboration was predicted to interact with message order such that the second message would have a greater impact on subsequent preferences

under low than under high elaboration conditions. Each interaction would be predicted if increased elaboration renders the initial preference less resistant to change.

## Method

### *Participants and Design*

One hundred forty undergraduate introductory psychology students at The Ohio State University were randomly assigned to the cells of a 2 (elaboration: low vs. high) x 2 (message order: pro-chocolate first vs. anti-chocolate first) between subjects factorial design. The students received partial course credit for participating. As in Study 1, participants who failed to follow directions were excluded ( $N = 6$ ), leaving a final  $N$  of 134.

### *Procedure*

Study 2 followed the same procedure as Study 1 with a few minor changes. As in Study 1, participants were assigned to either the high or low elaboration condition prior to reading a message in favor or against eating chocolate. The elaboration manipulation remained in effect during the message and thought listing but ended before students reported their initial preferences between two food options. After participants completed several filler measures, they were told, “Research has shown that some people like to be well informed prior to making decisions about food. At this point, we would like to present you with more evidence about the consequences of chocolate consumption. This is just for your benefit in case you would like to be more informed.” Participants then read the opposite message. That is, if participants initially read the pro-chocolate message, they then read the anti-chocolate message and vice versa. Participants then



completed a thought listing task and reported their snack preferences a second time before being thanked, debriefed and dismissed.

### *Independent Variables*

*Elaboration.* Participants were randomly assigned to either the low or high elaboration conditions from Study 1. Participants reported their number, thus ending the cognitive load manipulation after reporting their thoughts on the first message, but before reading the second message and answering any of the dependent measures described below. Thus, the cognitive load manipulation only influenced participants' amount of elaboration while reading the first message.

*Message Order.* Because examining objective resistance to change was a core goal of Study 2, participants first read a message either in favor or against chocolate at Time 1 while under the same cognitive load manipulation as in Study 1 and then, after completing several dependent measures, participants read the opposite message. That is, those who read the anti-chocolate message first then read the pro-chocolate message at Time 2, whereas those who read the pro-chocolate message first then read the anti-chocolate message. Thus, all participants read both messages, though the order of the messages varied.

### *Dependent Variables*

*Manipulation Checks.* In order to verify that the cognitive load adequately manipulated elaboration while reading the first message, participants reported their thoughts while remembering their number. Additionally, after reporting their number, participants reported the extent to which they paid attention to (1 = no attention, 9 = a lot

of attention), thought about (1 = thought very little, 9 = thought a lot), and exerted effort thinking (1 = no effort, 9 = a lot of effort) about the message.

*Preferences.* As in Study 1, after answering several filler measures and reporting their number, participants considered a hypothetical choice between two snacks. Because pilot data suggested that the options in Study 1 (i.e., carrots and chocolate chip cookies) were unequal in their initial desirability, we changed these options to grapes and M&Ms in Study 2. Pilot data indicated that these options were more equivalent in desirability, but clearly different on perceived healthiness and the degree to which they contain chocolate. Participants then reported their preferences towards this choice by responding to the following: “Please mark on the following scale how much you would like EITHER the grapes OR the M&Ms” (1 = extremely prefer M&Ms, 7 = extremely prefer grapes). This question was included at both Time 1 (after reading the first message and reporting their assigned number) and Time 2 (after reading the attacking message). As in Study 1, this variable was coded such that higher numbers indicate a preference for the long-term goal-inconsistent option (i.e., the M&Ms).

## Study 2 Results

*Elaboration Manipulation Check.* The data were examined to ensure that participants were able to correctly recall their assigned number. As expected, almost all participants in the high elaboration condition ( $n = 73$ , 98.6%) were able to recall the two-digit number and the majority of participants in the low elaboration condition ( $n = 61$ , 83.6%) were able to recall the seven-digit number. All participants who misremembered

their seven-digit number were able to recall between five and seven of the digits correctly.

As in Study 1, the number of thoughts participants generated was analyzed using a 2 (elaboration: low vs. high) x 2 (message order: anti-chocolate first vs. pro-chocolate first) ANOVA. Elaboration did not influence the total number of thoughts participants generated,  $F(1, 130) = 0.05, p = .82, d = .02$ . Examination of the number of relevant thoughts (excluding irrelevant thoughts) yielded similar findings,  $F(1, 130) = 0.30, p = .59, d = .05$ . Due to a computer programming error, it was not possible to examine whether the manipulation of elaboration influenced the number of words within participants' thoughts. Participant's responses to the perceived elaboration items were also analyzed. As expected, participants reported elaborating on the message more in the high elaboration condition ( $M = 4.92, SD = 1.85$ ) than in the low elaboration condition ( $M = 5.47, SD = 1.80$ ),  $F(1, 130) = 2.86, p = .09, d = .15$ . Analysis of the individual items separately showed that two (i.e., reported attention and effort) produced significant ( $p < .05$ ) effects.

*Preferences.* Participants' initial preferences were analyzed using a 2 (elaboration: low vs. high) x 2 (message order: anti-chocolate first vs. pro-chocolate first) ANOVA. Participants who initially read the pro-chocolate message ( $M = 3.95, SD = 1.84$ ) preferred the M&Ms more than those who read the anti-chocolate message ( $M = 3.29, SD = 1.67$ ),  $F(1, 130) = 4.19, p = .04, d = .18$ . Neither elaboration nor the interaction between elaboration and message order significantly influenced participants' initial preferences ( $ps > .47$ ). As in Study 1, these results showed that the direction of one's thoughts

significantly influenced initial preferences and this was not moderated by elaboration, as intended.

Although the results of this ANOVA show that message direction influenced initial preferences, it does not demonstrate whether these preferences were resistant to change as a result of exposure to the second message. To test this, participants' preferences at Time 2 were regressed on preferences at Time 1, elaboration, message, and all of the appropriate interactions.<sup>5</sup>

First, as expected, preferences at Time 1 significantly predicted preferences at Time 2,  $B = .83$ ,  $t(126) = 14.25$ ,  $p < .001$ . However, as hypothesized, this effect was qualified by elaboration,  $B = .14$ ,  $t(126) = 2.44$ ,  $p = .02$  (see Figure 3). This interaction indicated that initial preferences were more predictive of subsequent preferences when participants had the ability to elaborate on the first message,  $B = .97$ ,  $t(69) = 14.91$ ,  $p < .001$ , compared to when they did not,  $B = .69$ ,  $t(57) = 6.78$ ,  $p < .001$ . The three-way interaction between initial preferences, message order, and elaboration was not significant,  $B = .01$ ,  $t(133) = 0.21$ ,  $p = .83$ , which suggests that elaboration can increase preference strength regardless of the direction of one's initial thoughts.

---

<sup>5</sup> There are three ways to analyze resistance to change in persuasion studies. We present the results from analyses where we regress preferences at Time 2 on preferences at Time 1 and the independent variables of interest. Alternatively, we could also use a repeated measures ANOVA to examine whether there is an effect of time on preferences, which should be moderated by elaboration. Furthermore, we could calculate the difference between preferences over time. Analyzing the data using each of the three approaches yields conceptually similar results, although these results are not always significant at traditionally accepted levels (i.e.,  $p < .05$ ). For simplicity and space considerations, we present only the results from the regression approach for each of our objective resistance studies. We believe that this approach is the most informative for the current research because the two key hypotheses are that (1) elaboration increases the strength of the relationship between initial and subsequent preferences and (2) elaboration decreases the impact of the second message on time 2 preferences. Nonetheless, the results using the other analytical strategies for Study 2 are reported in Appendix C.

Second, message order significantly influenced preferences at Time 2,  $B = -.23$ ,  $t(126) = -2.28$ ,  $p = .02$ , suggesting that participants' preferences at Time 2 on average reflected the second message they read. However, the interaction between elaboration and message order on Time 2 preferences was not significant,  $B = .14$ ,  $t(126) = 1.38$ ,  $p = .17$ . Nonetheless, inspection of the data suggested that the data were directionally consistent with our hypotheses (see Figure 4). Message order significantly influenced participants' subsequent preferences in the low elaboration condition,  $B = -.38$ ,  $t(57) = -2.16$ ,  $p = .04$ , but not in the high elaboration condition,  $B = -.09$ ,  $t(69) = -.77$ ,  $p = .44$ . That is, low elaboration individuals were more favorable toward the chocolate option when the pro-chocolate message was presented second rather than first, whereas high elaboration individuals were not influenced by which message came second.

Taken together, these results demonstrate that when participants had the opportunity to elaborate on their initial thoughts, their initial preferences were more resistant to an attack message. However, when they did not elaborate on those initial thoughts, their subsequent preferences tended to be more susceptible to change as a function of the second message they read. Study 2 thus extended the results from Study 1 by showing that elaboration increases the impact of initial preferences on subsequent preferences and also tends to reduce the impact of an attacking message. In the next study, we examined another consequence of elaboration – that initial elaboration would lead attitudes to be more predictive of behavior (see Petty & Krosnick, 1995) even if those initial attitudes come under attack.

## Chapter 4: Study 3

Study 3 examined whether individuals who read an initial pro- or anti-chocolate message under high elaboration relative to low elaboration conditions would not just resist changing after a second counter-message, but would show behavioral choices that were more in line with their initial preferences. Furthermore, to enhance ecological validity, we conducted this study in a field setting.

### Method

#### *Participants and Design*

Two hundred sixty three undergraduate students recruited from the Ohio State University Student Union were randomly assigned to the cells of a 2 (elaboration: low vs. high) x 2 (message: pro-chocolate first vs. anti-chocolate first) between participants factorial design. We offered participants a piece of candy of their choice as compensation for participating.

#### *Procedure*

Participants in Study 3 were asked if they would be willing to complete a short study about food choices for the Psychology Department as they walked through the Student Union. After providing informed consent, participants were handed a brief paper/pencil survey. As in Studies 1 and 2, participants read messages containing strong arguments in favor of or against eating chocolate while experiencing relatively high or

low cognitive load. After completing a few additional questions, participants were then asked to read an opposing message. Participants also provided demographic information, including whether or not they had eaten chocolate yet that day. As they returned their survey, but before being offered a debriefing, participants were offered their choice of candy from a large box filled with a variety of chocolate and non-chocolate candies (e.g., Hershey's chocolate, Reese's peanut butter cups, Skittles, Starburst).

### *Independent Variables*

*Elaboration.* As in Studies 1 and 2, participants were randomly assigned to remember either a seven (low elaboration) or two (high elaboration) digit number while reading a message about chocolate, reporting their thoughts about the message and answering filler questions to enhance the cover story. They reported their number, thus ending the cognitive load manipulation, before making their choice of candy described below. Thus, our cognitive load manipulation only influenced participants' amount of elaboration while reading the first message.

*Message Order.* As in Studies 1 and 2, participants were randomly assigned to read an initial message either in favor or against eating chocolate. Both messages at Time 1 contained the same strong arguments in favor of or against eating chocolate from Studies 1 and 2. After completing several dependent measures, participants then read an attack message. Because the goal of Study 3 was to show that elaboration increases the likelihood that one's initial preferences will predict their subsequent behavior, the second (attacking) message participants read was designed to be weaker than the first so that it was less likely to change participants' initial preferences (see Petty, Haugtvedt, & Smith,

1995).<sup>6</sup> For example, a weak argument against eating chocolate said that, “Eating the last available chocolate can cause relationship problems and fights.” Alternatively, a weak argument in favor of eating chocolate stated, “If pregnant women can eat chocolate to satisfy pregnancy cravings, why can’t people that aren’t pregnant eat chocolate?” All participants read messages both in favor of and against eating chocolate but the order varied with the first message always being strong and the second being weak (see Appendix A).

*Dependent Variable: Choice*

After completing all experimental materials, including several filler measures, participants took their packet to an experimenter waiting at a table. The researcher thanked the students for their participation and told them, “Please help yourself to some candy if you like,” while she was ostensibly organizing papers. After participants chose their candy, she surreptitiously coded whether they chose candy with chocolate (e.g., Hershey’s Chocolate), candy without chocolate (e.g., Skittles), or no candy. Because participants might have expected that the researchers would be able to readily code

---

<sup>6</sup> In order to generate these messages, we recruited 72 participants in Ohio State’s Thompson Library and asked them to list as many thoughts as they could easily generate either on why they should or should not eat chocolate. We then compiled and consolidated these participant-generated thoughts into a list of 58 separate thoughts. We recruited a second sample of 44 participants from the same population as Study 1 and asked them to read each thought, which was presented in random order, and report the extent the thought favored eating chocolate (1 = against, 7 = in favor), strength of the thought (1 = very weak, not at all compelling; 7 = very strong, very compelling), and their agreement with the thought (1 = completely disagree, don’t believe it at all; 7 = completely agree, completely believe it). On the basis of these data, we chose five arguments for each of the four conditions (strong pro-chocolate arguments, weak pro-chocolate arguments, strong anti-chocolate arguments, and weak anti-chocolate arguments). Overall, participants rated the pro-chocolate arguments ( $M = 5.63$ ,  $SD = .89$ ) as being more favorable towards eating chocolate than the anti-chocolate arguments ( $M = 2.09$ ,  $SD = .85$ ),  $F(1, 43) = 13.09$ ,  $p = .001$ ,  $d = .49$ . Furthermore, participants rated the strong arguments ( $M = 4.86$ ,  $SD = .82$ ) as more compelling than the weak arguments ( $M = 2.86$ ,  $SD = .90$ ),  $F(1, 43) = 172.81$ ,  $p < .001$ ,  $d = .89$ . Similarly, participants agreed more with the strong arguments ( $M = 4.77$ ,  $SD = .91$ ) than the weak arguments ( $M = 2.83$ ,  $SD = .90$ ),  $F(1, 43) = 150.20$ ,  $p < .001$ ,  $d = .88$ . Dieting status did not moderate these effects.



choices between grapes and M&Ms given their remarkably different appearance, participants were offered chocolate or non-chocolate candy in order to limit experimental demand effects.

### Study 3 Results

*Manipulation Check.* The data were first examined to ensure that participants were correctly able to recall their assigned number. Unexpectedly, a large number of participants did not correctly complete the cognitive load manipulation question. Thirty nine participants (14.8%) did not list a number at all, indicating that they either never saw the cognitive load manipulation on the first page or could not recall any of it, whereas 38 participants listed a number with fewer than five correct digits (14.4%). These differences may be due to collecting data in a field setting rather than a more controlled laboratory setting. Participants who failed the manipulation check in these ways were excluded from the analyses.

*Candy Choice.* Participants' choices (i.e., between chocolate candy vs. candy without chocolate) were regressed on elaboration (low vs. high) and message order (pro-chocolate first vs. anti-chocolate first) using logistic regression. The manipulations of elaboration and message order were effects coded for these analyses (high elaboration = 1, low elaboration = -1; pro-chocolate 1<sup>st</sup> = 1, anti-chocolate 1<sup>st</sup> = -1). Because a large number of participants ( $n = 35$ , 19.4%) reported already having eaten chocolate on the day of our study, this variable was included as a covariate in this analysis.<sup>7</sup> In general, participants who read the pro-chocolate message first were more likely to choose candy

---

<sup>7</sup> Analyses in which previous chocolate consumption is not a covariate are consistent with these effects. All significant effects reported in the text are still significant at conventional levels (i.e.,  $ps < .05$ ).

with chocolate than those who read the anti-chocolate message,  $B = .43$ ,  $Z = 2.09$ ,  $p = .04$  (95% CI: .03, .84). More importantly, this pattern was qualified by elaboration,  $B = .42$ ,  $Z = 2.05$ ,  $p = .04$  (95% CI: .02, .82; see Figure 5). Decomposition of this interaction indicated that whether the initial message was pro- or anti-chocolate significantly influenced candy choices for those in the high elaboration condition,  $B = .78$ ,  $Z = 2.72$ ,  $p = .01$  (95% CI: .22, 1.33), but not for the low elaboration condition,  $B = -.06$ ,  $Z = -0.22$ ,  $p = .83$  (95% CI: -.64, .51). Thus, these results show that participants' exposure to the initial message significantly increased the likelihood that they would behave in accordance with the message, but only under high elaboration conditions. Participants who elaborated on the strong reasons to eat chocolate were more likely to take candy containing chocolate than those who elaborated on reasons not to eat chocolate, even after reading a message arguing the opposite. This pattern did not occur for those in the low elaboration conditions, which suggests that elaboration not only increases resistance to change as shown in the prior study, but also the ability to predict behavior.<sup>8</sup>

---

<sup>8</sup> This analysis naturally excluded participants who chose not to take any candy at all. Examination of whether participants took candy with chocolate versus non-chocolate or no candy yielded similar findings. The effect of message order is still in the same direction, but does not reach traditional levels of significance,  $B = .26$ ,  $Z = 1.60$ ,  $p = .11$  (95% CI: -.06, .58). More importantly, this pattern was marginally qualified by elaboration,  $B = .29$ ,  $Z = 1.78$ ,  $p = .08$  (95% CI: -.03, .62). Decomposition of this interaction indicated that the initial message significantly influenced candy choices for those in the high elaboration condition,  $B = .78$ ,  $Z = 2.34$ ,  $p = .02$  (95% CI: .08, .90), but not for the low elaboration condition,  $B = -.10$ ,  $Z = -0.39$ ,  $p = .69$  (95% CI: -.61, .40). If students who failed the manipulation check are included in the analyses, the effect of direction remains significant,  $B = .36$ ,  $Z = 2.22$ ,  $p = .03$ , but the interaction of elaboration and direction becomes non-significant,  $B = .21$ ,  $Z = 1.30$ ,  $p = .19$ .

## Chapter 5: Study 4

In sum, Study 3 showed that the extent to which people elaborate on a message is an important factor in predicting subsequent behavior. Based on Study 2, it seems likely that participants under high and low elaboration conditions formed the same initial preferences regardless of the extent of elaboration. Nonetheless, preferences formed under high elaboration conditions predicted behavior, whereas those formed under low elaboration did not. However, it is possible that despite using a weak second message, high elaboration individuals were more likely to resist its influence than those in the low elaboration condition. Even if differential resistance is in part responsible for the differential behavioral effects, the results still show an important consequence of differences in initial elaboration.

In considering the results of the studies so far, one may wonder if it is common for people to receive persuasive messages from an outside source while in the midst of a self-control conflict. Furthermore, one may wonder if the preference strength effects we observed so far would only hold when people are confronted by an external message attacking their views. All prior research in the attitudes domain looking at differential elaboration as a determinant of attitude strength has examined differential degrees of thinking about *externally generated* messages. In order to test if the same pattern of results would hold when participants generated their own reasons either in favor of or

against a temptation, which may be more akin to real-world self-control conflicts, we conducted an additional study to test if the results of Study 2 would replicate in a self-persuasion paradigm (where messages are self-generated) rather than a classic persuasion paradigm (where messages are other-generated). Finding such an effect would also make a novel contribution to the basic literature on attitudes and persuasion. That is, no prior research on self-persuasion has examined the degree of elaboration involved in that initial influence. As a result, no prior research has examined the strength consequences of differences in the elaboration involved in self-persuasion.

The change from a classic persuasion paradigm in which messages are externally generated to a self-persuasion paradigm (e.g., Janis & King, 1954), prompted consideration of the role of the relevance of the conflict. Self-control conflicts, which are dual-motive dilemmas between short-term temptations and long-term goals, require that the individual must simultaneously want both the long-term goal-consistent and goal-inconsistent options although these choices are mutually exclusive. If an individual does not simultaneously want both options, the situation does not represent a self-control conflict.<sup>9</sup>

Although messages generated by other people do not vary as a function of the relevance of the conflict to the recipient, self-generated messages may be susceptible to such variation. That is, one's thoughts may differ in some meaningful way when the conflict is self-relevant (versus irrelevant) because this is when people simultaneously

---

<sup>9</sup> As the term conflict implies, those for whom the conflict is relevant are objectively ambivalent about their choice because they recognize the positive and negative associations with both options (i.e., that the temptation is good in the short-term but bad in the long-term and vice versa). Should they not desire the goal or not perceive the temptation as competing with the goal, the conflict would not be relevant.

desire both options. For example, it is possible that dieters may generate thoughts that differ from those of non-dieters in some way because of the nature of the dual-motive conflict they experience. Our theoretical perspective suggests that the effects of direction of thoughts and amount of elaboration should be particularly impactful when the conflict is relevant (vs. irrelevant) because those who are ambivalent in their attitudes are more likely to be swayed by situational variables (e.g., DeMarree, Morrison, Wheeler, & Petty, 2011). As previously explained, one might expect a significant main effect of thought direction on preferences. However, it is also possible that this main effect could be qualified by relevance. Therefore, we measured and included self-relevance of the dieting conflict in Study 4 and used it as a factor in our design for exploratory purposes.

Because the length of the number participants remembered as part of the cognitive load manipulation in the previous studies could influence the content of participants' initial thoughts, the change from a classic persuasion paradigm to a self-persuasion paradigm required a new method to vary the extent of elaboration. Instead of being asked to recall a long or short number, participants in the high elaboration condition in this study were instructed to think further about the message they generated whereas low elaboration participants were not.

## Method

### *Participants and Design*

Four hundred one undergraduate introductory psychology students at The Ohio State University were randomly assigned to the cells of a 2 (elaboration: low vs. high) x 2 (thought direction order: pro-chocolate first vs. anti-chocolate first) between subjects

factorial design. The students received partial course credit for participating. In addition, dieting status was assessed as an indicator of the relevance of the conflict. Following the same procedure used in Studies 1 and 2, eight participants were excluded for failing to follow directions, leaving a final *N* of 393.

### *Procedure*

As in Studies 1 and 2, all participants completed the experimental materials on computers using MediaLab software (Jarvis, 2006). After providing informed consent, participants self-generated arguments in favor of or against eating chocolate. After reporting their thoughts and either thinking further about those thoughts or not, participants reported their preferences between eating either grapes or M&Ms. After several filler measures, participants were then asked to self-generate two opposing arguments, reported their preferences a second time, provided demographic information including the measure of relevance, were debriefed and dismissed.

### *Independent Variables*

*Thought Direction Order.* After providing informed consent, participants were randomly assigned to either generate pro-chocolate arguments or anti-chocolate arguments. Participants were asked to quickly list two reasons why they should or should not eat chocolate, respectively, were told that grammar and spelling did not matter and they did not need to write in full sentences (Cacioppo, Harkins, & Petty, 1981).

*Elaboration.* After listing their thoughts in the appropriate direction, participants were randomly assigned to either the high elaboration or low elaboration conditions. Participants in the high elaboration condition were told to go back and reread the

thoughts they just listed and elaborate on them. They were then presented with their thoughts again and were asked to “tell us a little bit more about these thoughts.” In contrast, participants in the low elaboration conditions simply moved on to the key preference dependent measure without being re-exposed to their thoughts.

*Relevance.* To assess whether participants would be conflicted about eating chocolate, we measured their dieting status. We asked participants if they had ever been on a diet (yes/no) and if they were currently on a diet (yes/no). Because only 72 participants (18.3%) reported currently being on a diet, we instead used whether they had ever been on a diet (49%) as our measure of relevance (and thus ambivalence) in this study.

*Dependent Variable:*

Participants reported their initial and subsequent preferences between grapes and M&Ms on the same scales as Study 2 both after the initial message they generated and then again after the self-generated counter-message.

#### Study 4 Results

First, a 2 (elaboration: low vs. high) x 2 (thought direction order: anti-chocolate first vs. pro-chocolate first) x 2 (relevance: dieters vs. non-dieters) ANOVA was conducted on participants' initial preferences between grapes and M&Ms. As expected, dieters ( $M = 3.78$ ,  $SD = 1.57$ ) preferred the M&Ms more than non-dieters ( $M = 3.42$ ,  $SD = 1.55$ ),  $F(1, 385) = 4.81$ ,  $p = .03$ ,  $d = .11$ , suggesting that the M&Ms were more tempting for them. Furthermore, although those who were instructed to generate pro-chocolate thoughts preferred the M&Ms more than those who generated anti-chocolate

thoughts, the effect of direction on initial preferences was statistically weaker than in the previous studies, though in the appropriate direction,  $F(1, 385) = 1.94, p = .16, d = .07$ . The main effect of direction was also not further qualified by relevance,  $F(1, 385) = .22, p = .64, \eta_p^2 = .001$ .

Next, as in Study 2, subsequent preferences were regressed on initial preferences, elaboration, thought direction order, relevance, and all of the appropriate interactions.<sup>10</sup> As predicted, initial preferences significantly predicted subsequent preferences,  $B = 1.11, t(377) = 8.85, p < .001$ . Replicating studies 2 and 3, this main effect of initial preferences was qualified by elaboration, as indicated by a marginal 2-way interaction,  $B = -.24, t(377) = -1.92, p = .06$ . Whereas preferences at Time 1 significantly predicted preferences at Time 2 for both those in the low and high elaboration conditions,  $B = .87, t(190) = 4.91, p < .001$  and  $B = 1.35, t(187) = 7.65, p < .001$ , respectively, the two-way interaction suggests that this relationship was stronger for those in the high elaboration condition (see Figure 6). However, the 2-way interaction between thought direction order and elaboration was not significant,  $B = .03, t(377) = .15, p = .88$ , nor was the

---

<sup>10</sup> Furthermore, we also analyzed these data without dieting status as a factor. As expected, initial preferences predicted subsequent preferences,  $B = .76, t(385) = 18.37, p < .001$ . Contrary to our hypotheses, this main effect was not qualified by elaboration,  $B = .02, t(385) = .55, p = .58$ . Furthermore, there was no main effect of thought direction order or its interaction with elaboration,  $B = .05, t(385) = .79, p = .43$  and  $B = .03, t(385) = .44, p = .66$ , respectively. There was, however, a marginally significant interaction of initial preferences and thought direction order,  $B = -.07, t(385) = -1.77, p = .08$ , which was further qualified by elaboration as indicated by a significant 3-way interaction,  $B = .09, t(385) = 2.15, p = .03$ . Among participants in the high elaboration condition, there was only a significant main effect of initial preferences,  $B = .78, t(194) = 13.30, p < .001$ . While this main effect was also present for those in the low elaboration condition,  $B = .73, t(191) = 12.70, p < .001$ , it was further qualified by direction,  $B = -.16, t(191) = -2.79, p = .006$ . This simple 2-way interaction suggested that the correlation between initial and subsequent preferences was stronger for those who initially generated anti-chocolate thoughts first,  $B = .89, t(101) = 12.00, p < .001$ , relative to those who initially generated pro-chocolate thoughts,  $B = .57, t(92) = 6.42, p < .001$ .

For other ways to examine the resistance to change hypothesis in Study 4, please see Appendix D.



three-way interaction between thought direction order, elaboration, and relevance,  $B = -.04$ ,  $t(377) = -.28$ ,  $p = .78$ .

Most critical for the resistance to change hypothesis, the predicted three-way interaction of initial preferences, elaboration, and relevance emerged,  $B = .18$ ,  $t(377) = 2.17$ ,  $p = .03$  (see Figure 7). A nonsignificant simple 2-way interaction of initial preferences and elaboration among non-dieters showed that these initial preferences were equally strong across the two elaboration conditions,  $B = -.06$ ,  $t(208) = -1.96$ ,  $p = .23$ . Among dieters, however, this 2-way interaction approached significance,  $B = .12$ ,  $t(169) = 1.79$ ,  $p = .08$ . Although initial preferences predicted subsequent preferences for dieters in the low elaboration condition,  $B = .49$ ,  $t(85) = 5.16$ ,  $p < .001$ , this relationship was stronger for dieters in the high elaboration condition,  $B = .72$ ,  $t(84) = 7.98$ ,  $p < .001$ . Importantly, a non-significant 4-way interaction between Time 1 preferences, elaboration, direction, and relevance,  $B = -.03$ ,  $t(377) = -0.38$ ,  $p = .71$ , showed that, as predicted, these effects hold regardless of the direction of one's self-generated thoughts. Thus, the effect of initial preferences on subsequent preferences is strongest for dieters in the high elaboration condition.

In addition to replicating the interaction of elaboration and initial preferences among dieters in Study 4 several additional ancillary effects emerged. There was also an overall marginal 2-way interaction of elaboration and relevance,  $B = .23$ ,  $t(377) = 1.76$ ,  $p = .08$ . Elaboration did not significantly influence preferences at Time 2 for non-dieters,  $B = .009$ ,  $t(208) = 0.11$ ,  $p = .91$ , but elaboration did significantly predict preferences at Time 2 for dieters,  $B = .24$ ,  $t(169) = 2.30$ ,  $p = .02$ . That is, dieters who elaborated on

their chocolate-related thoughts were more likely to prefer M&Ms over those who didn't elaborate.

Furthermore, a significant 2-way interaction of initial preferences and relevance,  $B = -.25$ ,  $t(377) = -3.08$ ,  $p = .002$ , suggested that although preferences at Time 1 significantly predicted preferences at Time 2 for both non-dieters and dieters,  $B = .86$ ,  $t(208) = 16.65$ ,  $p < .001$  and  $B = .61$ ,  $t(182) = 9.23$ ,  $p < .001$ , respectively, this pattern was stronger for the non-dieters. This is consistent with what attitudes research would suggest because dieters are presumably more ambivalent and thus their attitudes should be less resistant to change than those of non-dieters. A significant three-way interaction of initial preferences, direction, and relevance, indicates that this lower-order 2-way interaction was further qualified by the direction of participants' thoughts,  $B = -.23$ ,  $t(377) = -2.77$ ,  $p = .006$  (see Figure 8). For non-dieters, although preferences at Time 1 predicted preferences at Time 2, this pattern was not qualified by the direction of their self-generated thoughts,  $B = .02$ ,  $t(208) = 0.46$ ,  $p = .65$ . That is, non-dieters preferences at Time 1 predicted their preferences at Time 2 regardless of whether those preferences were based on pro-chocolate or anti-chocolate self-generated thoughts. For dieters, on the other hand, preferences at Time 1 predicted preferences at Time 2 significantly more when participants initially self-generated anti-chocolate thoughts,  $B = .81$ ,  $t(86) = 9.39$ ,  $p < .001$ , relative to pro-chocolate thoughts,  $B = .40$ ,  $t(86) = 4.05$ ,  $p < .001$ , as indicated by a significant initial preferences by direction interaction,  $B = -.20$ ,  $t(169) = -3.12$ ,  $p = .002$ . Although unexpected, these results are consistent with our conceptualization because dieters are ambivalent about conflicts between tempting options such as M&Ms and

healthier options such as grapes. When asked to generate pro-temptation thoughts, the dieters may have generated thoughts that aroused their ambivalence, which would thus decrease the correspondence between preferences over time. That this does not happen when dieters generate anti-temptation thoughts or for non-dieters suggests that these effects may indeed be driven by ambivalence.

Finally, the lower-order 2-way interaction of initial preferences and direction was also significant,  $B = .25$ ,  $t(377) = 2.00$ ,  $p = .05$ . This two-way interaction indicated that although preferences at Time 1 significantly predicted preferences at Time 2 for both those who generated anti-chocolate and pro-chocolate arguments at Time 1,  $B = .86$ ,  $t(195) = 4.63$ ,  $p < .001$  and  $B = 1.36$ ,  $t(182) = 8.06$ ,  $p < .001$  respectively, this relationship was stronger for those in the pro-chocolate condition regardless of dieting status.

In summary, the results from Study 4 replicate some of the key findings from Study 2. These data showed not only that the direction of one's thoughts influenced initial preferences regardless of the amount of elaboration, but also that elaboration made these preferences more predictive of subsequent preferences. We did not, however, find evidence for the second predicted interaction that direction of the counter-message would have a greater impact on low than high elaboration individuals. Nonetheless, Study 4 goes beyond the previous studies to show that predicted attitude strength effects can replicate when participants generate their own thoughts rather than reading an externally provided persuasive message. Additionally, Study 4 also shows that these effects are

more likely for those for whom the conflict is relevant (i.e., dieters), presumably because these individuals are the most conflicted about what to choose.

## Chapter 6: Study 5

So far, Studies 1-4 show that the direction of one's thoughts can influence initial preferences and that these initial preferences exert a stronger influence on subsequent preferences the more one elaborates on his/her thoughts. However, we did not produce consistent evidence for our second prediction that elaboration of one's initial thoughts would moderate the impact of the second message on attitudes. One possibility is that each of the prior studies focused on dieting conflicts and well entrenched attitudes toward chocolate. Thus, it would be useful to test our second hypothesis on a less well entrenched area of conflict. Second, it is worthwhile to test the first hypothesis for which we found clear support on a second kind of conflict as well because the attitudinal perspective suggests that these effects need not be limited to dieting; they could apply to any self-control conflict.

From delaying the gratifying experience of eating a single marshmallow in exchange for eating two marshmallows after 15 minutes (Mischel, Shoda, & Rodriguez, 1989) to waiting to take a larger amount of money later over a smaller amount of money now (Green, Fristoe, & Myerson, 1994), self-control can be defined as preferring larger later rewards over smaller immediate rewards (see Fujita, 2011). In order to enhance the generalizability of our findings, Study 5 tests our hypotheses using a classic paradigm in self-control research: delayed discounting (e.g., Green & Myerson, 2004). This research

suggests that people prefer getting a smaller amount of money in the immediate future rather than a larger amount after a delay. Although people will chose delayed rewards on occasion, those delayed rewards must often be much larger in order to be preferred over a smaller sooner reward (e.g., Green & Myerson, 2004).

However, if one's thoughts can influence people's preferences for one option over another, then generating reasons why one should take a smaller amount of money sooner instead of a larger amount of money later should lead people to exert less self-control. Similarly, generating reasons why one should take the larger amount of money later instead of the smaller amount of money sooner should lead one to exert more self-control. Furthermore, the more people elaborate on these thoughts, the more likely it is that these initial preferences should influence subsequent preferences even when people generated counterarguments to their initial stance. Most importantly, the more people elaborate on their initial thoughts, the less their counter-thoughts should be impactful in influencing subsequent preferences. Study 5 tests these hypotheses.

### *Participants and Design*

Five hundred forty nine undergraduate introductory psychology students at The Ohio State University were randomly assigned to the cells of a 2 (elaboration: low vs. high) x 2 (thought direction order: smaller sooner first vs. larger later first) between subjects factorial design.<sup>11</sup> The students received partial course credit for participating.

---

<sup>11</sup> One might wonder why the sample size for Study 5 was significantly larger than the other studies in which we used a similar design. This occurred for two reasons. First, because Study 4 showed that participants' self-generated thoughts may be influenced by a wide variety of factors, only one of which was our experimental manipulation of thought direction, collecting a larger number of participants increased the likelihood of an adequate test of the key hypotheses despite this additional noise. Second, these data were collected during a period in which a large number of participants were desperately

One hundred fifty-eight participants were excluded who reported completing an experiment with very similar materials in the past, leaving a final sample of 373.

### *Procedure*

Participants in Study 5 were told that they would complete a study investigating how people make choices involving money and completed all experimental materials remotely using Qualtrics. After providing informed consent, participants generated two reasons why they should either take a smaller amount of money now over a larger amount of money later or vice versa. Participants in the low elaboration condition immediately moved on to the dependent measures, whereas participants in the high elaboration condition were presented with the reasons they initially listed and elaborated on them as in Study 4. Participants then completed the initial delayed discounting measures described below, completed several filler items, briefly listed two thoughts in the opposite direction, and completed the temporal discounting measures a second time. Finally, participants provided demographic information, were debriefed and dismissed.

### *Independent Variables*

*Thought Direction Order.* After providing informed consent, participants were randomly assigned to either a smaller sooner first or larger later first condition.

Participants read, “We’d like to begin by asking you to list your thoughts about a hypothetical financial choice. Imagine that a friend owes you money. Imagine this

---

seeking experimental studies with which to fulfill their course requirement. Thus data collection continued for a longer period of time to assist both these students and the research team to adequately meet the demands of the situation. Because other researchers did the same and were also conducting studies on temporal discounting, there was a much higher proportion of participants in this experiment who reported completing other studies very similar to ours. These participants ( $N = 158$ ) were excluded from the analyses reported here.

friend will pay you what he owes you now, or, if you wait, he'll pay you extra later.”

Participants in the smaller sooner condition were asked to briefly list two reasons why they should take the smaller amount now instead of the larger amount later whereas those in the larger later condition were asked to briefly list two reasons for the opposite. For example, a participant in the smaller sooner condition stated that, “The smaller amount may be helpful in paying bills due in the near future,” whereas a participant in the larger later condition said, “You end up getting more money in the long run.” As in Study 4, participants were explicitly told that grammar and spelling did not matter and they did not need to write in full sentences.

*Elaboration.* Also as in Study 4, participants were randomly assigned to either a high or low elaboration condition. Participants in the low elaboration condition simply moved from briefly listing two thoughts in the requested direction to the dependent variables. Participants in the high elaboration condition, on the other hand, were presented with their initial thoughts and asked to elaborate on these reasons in an essay box.

#### *Dependent Variable*

As the measure of temporal discounting, participants were asked to report how much they would be willing to pay (WTP) for gift cards being sold at a discounted rate in three scenarios twice (i.e., once after the first thought generation task and then again after generating thoughts in the opposite direction). In each scenario, participants reported how much they would be willing to pay for a gift card worth a certain value if they could use it immediately and again if they could use it only after a time delay. For example,



participants imagined a restaurant of their choice was selling gift certificates for \$150 at a discounted rate, but the gift certificate could not be used for 6 months. They reported how much they would be willing to pay for the gift card if it could only be redeemed six months from now and again if they could use it immediately. Because these questions were open-ended, participants could list any value, but values higher than \$150 would be illogical. They then answered similar questions for two additional scenarios (i.e., movie tickets valued at \$40 that could not be redeemed for one month, grocery store gift certificate valued at \$200 that could not be used for one year).

Because each of these scenarios were valued at different amounts, our dependent measure examined the percentage increase participants were willing to pay to use these gift certificates immediately. To compute this score, the amount participants were willing to pay to use the gift card in the future was subtracted from the amount they were willing to pay if they could use it immediately, which was then divided by the total value of the gift certificate. For example, if participants were willing to pay \$75 to use a certificate now versus \$50 later when the value of the certificate was \$100, they would receive a score of .25  $([75-50]/100)$ . These values for the three scenarios were averaged to form an index of participants' discounting rates as our dependent measure ( $\alpha_{Time\ 1} = .61$ ,  $\alpha_{Time\ 2} = .65$ , for a similar treatment of such DVs, see Fujita, et al., 2006).

### Study 5 Results

As in the previous studies, a 2 (elaboration: low vs. high) x 2 (thought direction order: smaller sooner first vs. larger later first) ANOVA on the initial index of WTP for the gift cards was conducted. As predicted, participants who generated reasons in favor

of taking the smaller amount of money sooner ( $M = 0.23$ ,  $SD = .15$ ) were willing to pay more money to get the gift certificate sooner than those who generated reasons in favor of taking the larger amount of money later ( $M = .20$ ,  $SD = .15$ ),  $F(1, 369) = 4.19$ ,  $p = .04$ ,  $d = .11$ . The main effect of elaboration and the interaction between elaboration and direction were not significant,  $F(1, 369) = 0.13$ ,  $p = .72$ ,  $d = .02$  and  $F(1, 369) = 0.04$ ,  $p = .85$ ,  $\eta^2_{partial} = .00$ , respectively. This suggests that the direction of one's thoughts significantly influenced initial preferences regardless of amount of elaboration.

Next, participants' WTP at Time 2 was regressed on WTP at Time 1, elaboration, direction, and all appropriate interactions.<sup>12</sup> Thought direction order significantly influenced the subsequent amount participants were willing to pay for gift certificates,  $B = -.01$ ,  $t(363) = -2.86$ ,  $p = .004$ , indicating that participants WTP reflected the second set of thoughts they generated. Furthermore, initial WTP significantly predicted subsequent WTP,  $B = .62$ ,  $t(363) = 18.14$ ,  $p < .001$ . However, as expected, this pattern was qualified by elaboration,  $B = .07$ ,  $t(363) = 1.93$ ,  $p = .05$  (see Figure 9). While WTP at Time 1 significantly predicted WTP at Time 2 for those in the low elaboration condition,  $B = .56$ ,  $t(176) = 10.60$ ,  $p < .001$ , this pattern was stronger among those in the high elaboration condition,  $B = .69$ ,  $t(187) = 15.54$ ,  $p < .001$ .

Furthermore, elaboration and direction jointly predicted subsequent WTP,  $B = .01$ ,  $t(363) = 2.22$ ,  $p = .03$  (see Figure 10). The direction of participants most recently generated thoughts significantly influenced subsequent WTP for those in the low elaboration condition,  $B = -.03$ ,  $t(187) = -3.25$ ,  $p = .001$ , but not for those in the high

---

<sup>12</sup> For results from different analytical strategies to examine the resistance to change hypothesis, please see Appendix E.

elaboration condition,  $B = .00$ ,  $t(187) = .51$ ,  $p = .61$ . Taken together, these data show that WTP for participants in the high elaboration condition was significantly influenced by their initial thoughts. However, participants' WTP in the low elaboration condition was influenced less by their initial thoughts than those high in elaboration and more by their most recently generated thoughts. Thus, these data demonstrate that elaborating on thoughts about a financial conflict (e.g., taking a smaller amount of money now versus a larger amount later or vice versa) makes one's WTP proclivities stronger and therefore influences how much participants would be willing to pay even after generating thoughts in the opposite direction.

### Study 5 Discussion

There are three notable strengths to this experiment. First, whereas the previous studies used a paradigm with a close correspondence between the content of one's thoughts and the preferences they reported, the thoughts and preferences in Study 5 were more dissociated. Although participants reported their willingness to pay for gift cards as the key dependent measure, their thoughts were about what they would do in financial conflicts where a friend owed them money. The fact that this new paradigm was able to replicate key results when one's thoughts and the dependent variable of interest were more dissociated increases convergent validity.

The second strength is that we were able to replicate our prior results using a paradigm more common in self-control research: delayed discounting. Furthermore, this classic self-control paradigm relied on assessment of participants' willingness to pay for various objects, which is often used as a behavioral measure of self-control. Finally,

Study 5 suggested that the self-persuasion paradigm was effective despite the complexity of the data from Study 4. In particular, in addition to replicating the interaction of elaboration and initial attitude on attitudes following an attack, we were able to obtain the interaction of elaboration and direction of second message on attitudes that was marginal or absent in the prior studies. In short, Study 5 provides additional support for the notion that self-generated messages in favor or against a temptation can influence preferences and behavior in the same manner as externally-generated messages.

## Chapter 7: Combined Analyses for Studies 2, 4 & 5

Given that Studies 2, 4, and 5 were similar in methodology in that each measured participants' initial and subsequent preferences, we combined and re-analyzed the data. This combination provides a statistically more powerful test of the effects that were directionally consistent but not statistically significant in the prior studies. Initial and subsequent preferences, respectively, were standardized within study prior to being combined. Because the two self-persuasion studies (Studies 4 and 5) produced similar effects when they were compared, these were combined to contrast against the classic external persuasion study (Study 2).<sup>13</sup> In the combined analyses 134 participants were from the classic persuasion paradigm used in Study 2 and 766 participants were from the self-persuasion paradigm used in Studies 4 & 5.

*Initial Preferences.* Participants' initial preferences were analyzed using a 2 (elaboration: low vs. high) x 2 (thought direction order: goal-consistent first vs. goal-inconsistent) x 2 (Study: Classic persuasion versus Self-persuasion) ANOVA. As expected, participants in the goal-inconsistent first conditions (i.e., pro-chocolate first,

---

<sup>13</sup>Specifically, an analysis was conducted in which preferences at time 2 were regressed on preferences at time 1, elaboration (high versus low), thought direction order (long term goal consistent first vs. goal-inconsistent first) and self-persuasion study topic (dieting versus delayed discounting). In this analysis Study 4 (dieting) was coded as -1 and Study 5 (delayed discounting) was coded as 1. In this analysis, the predicted interactions tended to emerge unqualified by study. That is, elaboration interacted with initial preferences,  $B = .05$ ,  $t(748) = 1.78$ ,  $p = .08$ ., and with thought direction order,  $B = .05$ ,  $t(748) = 1.89$ ,  $p = .06$ . However, neither of these two way interactions was further moderated by study topic (all  $ps > .20$ ). Thus, the two self-persuasion studies (Studies 4 and 5) were combined to compare to the external persuasion study (Study 2).

smaller sooner first conditions;  $M = .11$ ,  $SD = 1.01$ ) preferred the goal-inconsistent option more than those in the goal-consistent conditions first (i.e., anti-chocolate first, larger later first conditions;  $M = -.11$ ,  $SD = .97$ ),  $F(1, 888) = 10.19$ ,  $p = .001$ ,  $d = .21$ . No other effects were significant (all  $ps > .49$ ). This suggests that our manipulation of thought direction significantly influenced preferences across studies.

*Subsequent Preferences.* To test whether participants' preferences were resistant to change as a result of exposure to the second message, participants' preferences at Time 2 were regressed on preferences at Time 1, elaboration, thought direction order, study, and all of the appropriate interactions.<sup>14</sup> The results were exactly as predicted.<sup>15</sup> As expected, initial preferences predicted subsequent preferences,  $B = .74$ ,  $t(882) = 21.12$ ,  $p < .001$ , but this effect was qualified by elaboration,  $B = .09$ ,  $t(882) = 2.64$ ,  $p = .008$  (see Figure 11). Although initial preferences predicted subsequent preferences under both high and low elaboration conditions,  $B = .83$ ,  $t(454) = 19.19$ ,  $p < .001$  and  $B = .65$ ,  $t(428) = 11.59$ ,  $p < .001$ , respectively, this effect was stronger for those in the high elaboration conditions. Furthermore, a significant effect of thought direction order demonstrated that the second message participants read influenced their subsequent preferences,  $B = -.08$ ,  $t(882) = -2.35$ ,  $p = .02$ . This effect also tended to be qualified by elaboration as expected,  $B = .06$ ,  $t(882) = 1.83$ ,  $p = .07$  (see Figure 12). Thought direction order significantly

---

<sup>14</sup> For this analysis, the Study variable was effects coded such that the classic persuasion paradigm (Study 2) was coded as -1 and the self-persuasion paradigm (Studies 4 & 5) were coded as 1. We chose this coding scheme because it allows us to test whether we would replicate the results from the classic persuasion paradigm in a self-paradigm persuasion, which is interesting considering that no previous research has examined the role of thoughtful vs. nonthoughtful self-persuasion.

<sup>15</sup> For results using other analytical strategies to test the resistance to change hypothesis, please see Appendix F. Regardless of data analysis strategy, the results were consistent with our predictions.

influenced subsequent preferences under low elaboration,  $B = -.14$ ,  $t(428) = -2.68$ ,  $p = .008$ , but not under high elaboration,  $B = -.02$ ,  $t(458) = -.41$ ,  $p = .68$ . No other effects were significant (all  $ps > .13$ ). Furthermore, Study did not moderate either the elaboration by initial preferences interaction,  $B = -.04$ ,  $t(882) = -1.24$ ,  $p = .22$ , nor the elaboration by thought direction interaction,  $B = -.01$ ,  $t(882) = -.37$ ,  $p = .71$ .

Taken together, these results demonstrate that when participants had the opportunity to elaborate on their initial thoughts, their subsequent preferences were resistant to an attack message. However, when they did not elaborate on those initial thoughts, their subsequent preferences were susceptible to change as a function of the second message they read. In short, elaboration made participants' preferences resistant to change.

## Chapter 8: Discussion

In the present work, we attempt to clarify the role of the extent of thinking in self-control conflicts. Specifically, we challenge the notion that more thinking is always good for self-control because people are sometimes motivated and able to generate goal-inconsistent thoughts. We hypothesized and demonstrated that the direction of one's thoughts (whether goal-consistent or goal-inconsistent) influences preferences in the direction of those thoughts in a self-control conflict. Specifically, the data reported here showed that participants who were asked to either read or generate a persuasive message in favor of eating chocolate were more likely to prefer M&Ms over grapes than those who thought about not eating chocolate (Studies 2-4). We replicated these effects in a financial self-control conflict and showed that participants who were asked to generate reasons to take a smaller amount of money sooner were more likely to engage in temporal discounting than those who were asked to generate reasons to take a larger amount of money later (Study 5).

More important than showing that direction of thoughts affects the direction of action, the current research examined the consequences of the amount of thinking people use. Prior research on self-control had examined the extent of thinking at the time of choice, but the current research examined how the extent of thinking about an initial choice could be influential in determining subsequent choices even if those initial choices



were challenged. Drawing on the attitude strength literature, we hypothesized that initial elaboration about a choice would increase the strength of preferences (regardless of whether those preferences were for the goal-consistent or goal-inconsistent options) which would have consequences for subsequent choices. In accord with this view, the current research showed that initial elaboration about a choice increased perceived resistance to changing that choice (Study 1), objective resistance to changing that choice (Studies 2, 4, & 5), and enhanced preference-behavior consistency (Study 3). Additionally, we show that the relevance of the conflict moderated these effects (Study 4), which is consistent with the work on attitudinal ambivalence.

This research suggests that the attitudes and persuasion literature offers a number of insights that can clarify the role of thinking in self-control conflicts. This perspective suggests that thinking is not a panacea for self-control, but can be very helpful if applied properly. That is, the current research suggests a more nuanced approach that considers the direction of one's thoughts in addition to the amount of thinking people use to determine whether people will effectively exert self-control over time. That we show our effects using both perceived and objective measures of attitude strength as well as external and self-persuasion paradigms enhances the convergent validity of our findings. Furthermore, comparable effects were demonstrated across multiple domains (i.e., dieting and financial conflicts), with both preferences and behaviors, as well as in both lab and field settings.

The present research represents an important first step in increasing communication between two very disparate literatures on attitudes and persuasion and

self-control that have great potential for integration. We argue that self-control conflicts presuppose attitudinal ambivalence because in order for the conflict to exist, one must simultaneously want two mutually exclusive options driven by two competing motives.<sup>16</sup> Furthermore, as people resolve this self-control conflict, they may be persuaded to exert self-control or indulge. These persuasive messages may arise from features of the environment (e.g., the physical presence of the temptation, see Shiv & Fedorikhin, 1999; 2002; Mischel et al., 1972) or from one's self (e.g., one's impulses, see Hofmann, Baumeister, Förster, & Vohs, 2012). We believe that these ideas would have many important implications for research on health, judgment and decision making, consumer behavior, and much more.

There are also many important directions for future research. For example, future research could examine how and when participants generate goal-consistent versus goal-inconsistent thoughts. If there are situational variables that allow people to generate more goal-consistent thoughts, it may be helpful to incorporate such variables into interventions meant to increase self-control. Additionally, examination of the type of thoughts people generate could provide insights into research on attitudinal ambivalence, dissonance reduction, and more.

Second, future research might attempt to investigate characteristics of the goals that people hold to determine when and how people will exercise self-control. For instance, although the current research investigated the strength of one's preferences as a

---

<sup>16</sup> We would like to note that if individuals do not want both options simultaneously but are still pursuing a goal, they would be engaging in self-regulation rather than self-control. While we believe that the attitudes and persuasion literature can offer a number of important insights relevant to self-regulation, such ideas are beyond the scope of the current manuscript, which focuses exclusively on dual-motive conflicts.

function of elaboration, other research could focus on the strength with which people hold their goals. Drawing once again on research on attitude strength, we would expect that the strength of one's goals would increase the likelihood that people would act in line with those goals. For example, because certainty is one dimension of attitude strength (see Gross, Holtz, & Miller, 1995), we postulate that people who are certain in their goals will be more likely to show goal-behavior consistency than those who are relatively less certain. Indeed, enhanced certainty in the desirability of acting in accord with one's immediate desires (temptation) or one's long-term goal is likely a factor in producing the effects observed in the current studies. That is, extent of elaboration is a key determinant of certainty (Barden & Petty, 2008; Petty et al., 1995). The same logic could be applied to a number of other attitude strength variables (e.g., ambivalence, knowledge). This information may then be utilized to create interventions that promote goal-consistent behaviors (e.g., health behaviors).

Additionally, future research could focus on how the extensively researched previous variables involved in self-control may serve multiple roles by utilizing the Elaboration Likelihood Model (ELM; see Petty & Briñol, 2012). For example, research on ego-depletion suggests that people have a limited amount of self-control and, once depleted, they will likely experience self-control failures until they are able to replenish those resources (Baumeister, Bratslavsky, Muraven, & Tice, 1998). As a recent meta-analysis by Hagger and colleagues (Hagger, Wood, Stiff, & Chatzisarantis, 2010) suggested, there remains much work to be done to identify the mechanisms of ego-depletion. By applying an ELM approach to ego-depletion, one could suggest that ego-

depletion may function as a peripheral cue to indulge, influence the extent to which people are able to think about their current conflict, serve as an argument that justifies indulgence, biases the thoughts that come to mind, or influence the confidence with which people hold their thoughts. This perspective may offer a way to integrate and organize the previous research on ego-depletion into a single theoretical framework while offering novel future directions.

Although the advantages of connecting these two literatures are clear for self-control, the motivation and goal pursuit literatures may also offer a number of new and intriguing directions for attitudes and persuasion research. For example, in this manuscript, we examined the consequences of both high and low thinking processes using external and self-persuasion paradigms. Previous work comparing self-generated messages with other-generated messages suggested that self-persuasion may be more effective in part because it is relatively more thoughtful (e.g., Briñol, McCaslin, & Petty, 2012). In this manuscript, however, we demonstrate that self-persuasion may also be relatively more or less thoughtful. The role of the amount of thinking in self-persuasion paradigms previously has been unexplored and represents a new and exciting area for future research.

Additionally, this work builds on previous research on order effects in persuasion by using a manipulation of ability to think rather than motivation to think. Previous research on order effects (i.e., primacy versus recency effects) in persuasion typically utilized motivational manipulations of elaboration (e.g., personal relevance) that may have influenced elaboration both during the initial and the subsequent messages (e.g.,

Haugtvedt & Petty, 1992; Haugtvedt & Wegner, 1994; Petty, Tormala, Hawkins, & Wegener, 2001). In the studies presented here, however, we replicate the findings that primacy effects occur under high elaboration conditions and recency effects occur under low elaboration conditions using a cognitive load manipulation that was induced only during the first message. Furthermore, as attitudes and persuasion research begins to examine more thoroughly how people advocate for a given position by constructing and delivering persuasive messages, they could benefit from considering the goals that the source is attempting to meet.

Overall, we suggest that research on self-control and that on attitudes and persuasion have many previously unexplored parallels which can offer insights and novel hypotheses for both literatures. We look forward to seeing the intermingled growth of these literatures and look forward to opportunities to collaborate with others. These insights may lead to the development of effective interventions that promote healthy living, financial literacy, educational attainment, sustainable environmental practices, and much more.

## References

- Baumeister, R.F., Bratslavsky, E., Muraven, M., & Tice, D.M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology*, 74(5), 1252-1265. Doi: 10.1037/0022-3514.74.5.1252.
- Baumeister, R.F., & Heatherton, T.F. (1996). Self-regulation failure: An overview. *Psychological Inquiry*, 7(1), 1-15. Doi: 10.1207/s15327965pli701\_1.
- Barden, J., & Petty, R.E. (2008). The mere perception of elaboration creates attitude certainty: Exploring the thoughtfulness heuristic. *Journal of Personality and Social Psychology*, 95(3), 489-509. Doi: 10.1037/a0012559.
- Briñol, P., McCaslin, M.J., & Petty, R.E. (2012). Self-generated persuasion: Effects of the target and direction of arguments. *Journal of Personality and Social Psychology*, 102(5), 925-940. Doi: 10.1037/a0027231.
- Briñol, P., Rucker, D.D., Tormala, Z.L., & Petty, R.E. (2004). Individual differences in resistance to persuasion: The role of beliefs and meta-beliefs. In E.S. Knowles & J.A. Linn (Eds.), *Resistance and persuasion* (pp. 83-104). Mahwah NJ: Erlbaum.
- Cacioppo, J.T., & Harkins, S.G., & Petty, R.E. (1981). The nature of attitudes and cognitive responses and their relationships to behavior. In R. Petty, T. Ostrom, & T. Brock (Eds.), *Cognitive responses in persuasion* (pp. 31-54). Hillsdale, NJ: Erlbaum Associates.

- Chaiken, S., & Trope, Y. (Eds.). (1999). *Dual process theories in social psychology*. New York: Guilford Press.
- De Ridder, D.T.D., Lensvelt-Mulders, G., Finkenauer, C., Stok, F.M., & Baumeister, R.F. (2012). Taking stock of self-control: A meta-analysis of how trait self-control relates to a wide range of behaviors. *Personality and Social Psychology Reviews*, 16(1), 76-99. Doi: 10.1177/108886831148749.
- DeMarree, K.G., Morrison, K.R., Wheeler, S.C., & Petty, R.E. (2011). Self-ambivalence and resistance to subtle self-change attempts. *Personality and Social Psychology Bulletin*, 37(5), 674-686. Doi: 10.1177/0146167211400097.
- Fazio, R.H. (1990) Multiple processes by which attitudes guide behavior: The mode model as an integrative framework. *Advances in Experimental Social Psychology*, 23, 75-109. Doi: 10.1016/S0065-2601(08)60318-4.
- Ferguson, M.J., & Bargh, J.A. (2004). Liking is for doing: The effects of goal pursuit on automatic evaluation. *Journal of Personality and Social Psychology*, 87(5), 557-572.
- Finklestein, E.A., Trogdon, J.G., Cohen, J.W., & Dietz, W. (2009). Annual medical spending attributable to obesity: Payer- and service-specific estimates. *Health Affairs*, 28(5), w822-w831. Doi: 10.1377/hlthaff.28.5.w822.
- Fishbach, A., Friedman, R.S., & Kruglanski, A.W. (2003). Leading us not unto temptation: Momentary allurements elicit overriding goal activation. *Journal of Personality and Social Psychology*, 84(2), 296-309. Doi: 10.1037/0022-3514.84.2.296.

- Fishbach, A., & Shah, J.Y. (2006). Self-control in action: Implicit dispositions towards goals and away from temptations. *Journal of Personality and Social Psychology*, 90(5), 820-832. Doi: 10.1037/0022-3514.90.5.820.
- Fujita, K., Trope, Y., Liberman, N., & Levin-Sagi, M. (2006). Construal levels and self-control. *Journal of Personality and Social Psychology*, 90(3), 351-367. Doi: 10.1037/0022-3514.90.3.351.
- Fujita, K. (2011). On conceptualizing self-control as more than the effortful inhibition of impulses. *Personality and Social Psychology Review*, 15(4), 352-366. Doi: 10.1177/1088868311411165.
- Gilbert, D.T., & Osborne, R.E. (1989). Thinking backward: Some curable and incurable consequences of cognitive busyness. *Journal of Personality and Social Psychology*, 57(6), 940-949. Doi: 10.1037/0022-3514.57.6.940.
- Glasman, L.R., & Albarracín, D. (2006). Forming attitude that predict future behavior: A meta-analysis of the attitude-behavior relation. *Psychological Bulletin*, 132(5), 778-822. Doi: 10.1037/0033-2909.132.5.778.
- Green, L., Fristoe, N., & Myerson, J. (1994). Temporal discounting and preference reversals in choice between delayed outcomes. *Psychonomic Bulletin & Review*, 1(3), 383-389. Doi: 10.3758/BF03213979.
- Green, L. & Myerson, J. (2004). A discounting framework for choice with delayed and probabilistic rewards. *Psychological Bulletin*, 130(5), 769-792. Doi: 10.1037/0033-2909.130.5.769.



- Gross, S.R., Holtz, R., & Miller, N. (1995). Attitude certainty. In R.E. Petty & J.A. Krosnick (Eds.), *Attitude strength: Antecedents and consequences* (pp. 215-245). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Hagger, M.S., Wood, C., Stiff, C., Chatzisarantis, N.L.D. (2010). Ego depletion and the strength model of self-control: A meta-analysis. *Psychological Bulletin*, 136(4), 495-525. Doi: 10.1037/a0019486.
- Haugtvedt, C.P., & Petty, R.E. (1992). Personality and persuasion: Need for cognition moderates the persistence and resistance of attitude changes. *Journal of Personality and Social Psychology*, 63(2), 308-319. Doi: 10.1037/0022-3514.63.2.308.
- Haugtvedt, C.P., & Wegener, D.T. (1994). Message order effects in persuasion: An attitude strength perspective. *Journal of Consumer Research*, 21(1), 205-218. Doi: 10.1086/209393.
- Hofmann, W., Baumeister, R.F., Förster, G., & Vohs, K.D. (2012). Everyday temptation: An experience sampling study of desire, conflict, and self-control. *Journal of Personality and Social Psychology*, 102(96), 1318-1335. Doi: 10.1037/a0026545.
- Hofmann, W., Friese, M., & Strack, F. (2009). Impulse and self-control from a dual-system perspective. *Perspectives on Psychological Science*, 4(2), 162-176. Doi: 10.1111/j.1745-6924.2009.01116.x.
- Hofmann, W., Gschwendner, T., Friese, M., Wiers, R.W., & Schmitt, M. (2008). Working memory capacity and self-regulatory behavior: Toward an individual differences perspective on behavior determination by automatic versus controlled

- processes. *Journal of Personality and Social Psychology*, 95(4), 962-977. Doi: 10.1037/a0012705.
- Janis, I.L., & King, B.T. (1954). The influence of role playing on opinion change. *The Journal of Abnormal and Social Psychology*, 49(2), 211-218. Doi: 10.1037/h0056957.
- Jarvis, B. G. (2006). MediaLab (Version 2006.2.19) [Computer Software]. New York, NY: Empirisoft Corporation.
- Kahneman, D., & Frederick, S. (2002). Representativeness revisited: Attribute substitution in intuitive judgment. In *Heuristics and Biases: The Psychology of Intuitive Judgment* (pp. 49-81). New York, NY: Cambridge University Press.
- Kahneman, D., & Frederick, S. (2005). A model of heuristic judgment. In K.J. Holyoak, & R.G. Morrison (Eds.) *The Cambridge Handbook of Thinking and Reasoning* (pp. 267-293). New York: Cambridge University Press.
- Khan, U., & Dhar, R. (2006). Licensing effect in consumer choice. *Journal of Marketing Research*, 43(2), 259-266. Doi: 10.1509/jmkr.43.2.259.
- Maddux, W.W., Barden, J., Brewer, M.B., & Petty, R.E. (2005). Saying no to negativity: The effects of context and motivation to control prejudice on automatic evaluative responses. *Journal of Experimental Social Psychology*, 41(1), 19-35. Doi: 10.1016/j.jesp.2004.05.002.
- Metcalf, J., & Mischel, W. (1999). A hot/cool system analysis of delay of gratification: Dynamics of willpower. *Psychological Review*, 106(1), 3-19. Doi: 10.1037/0033-295X.106.1.3.

- Mischel, W., Shoda, Y., & Rodriguez, M.I. (1989). Delay of gratification in children. *Science*, 244(4097), 933-938. Doi: 10.1126/science.2658056.
- Neal, D.T., Wood, W., & Drolet, A. (2013). How do people adhere to goals when willpower is low? The profits (and pitfalls) of strong habits. *Journal of Personality and Social Psychology*, 104(6), 959-975. Doi: 10.1037/a0032626.
- Oppenheimer, D.M., Meyvis, T., & Davidenko, N. (2009). Instructional manipulation checks: Detecting satisficing to increase statistical power. *Journal of Experimental Social Psychology*, 45(4), 867-872. Doi: 10.1016/j.jesp.2009.03.009.
- Ouellette, J.A., & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. *Psychological Bulletin*, 124(1), 54-74. Doi: 10.1037/0033-2909.124.1.54.
- Petty, R.E., & Briñol, P. (2012). The Elaboration Likelihood Model. In P.A.M. Van Lange, A. Kruglanski, & E.T. Higgins (Eds.), *Handbook of theories of social psychology* (Vol. 1, pp. 224-245). London, England: Sage.
- Petty, R. E & Briñol, P. (2014). The elaboration likelihood and meta-cognitive models of attitudes: Implications for prejudice, the self, and beyond. In J. Sherman, B. Gawronski, & Y. Trope (Eds.), *Dual-process theories of the social mind* (pp. 172-187). New York, NY: Guildford Press.
- Petty, R.E., & Cacioppo, J.T. (1979). Issue involvement can increase or decrease persuasion by enhancing message-relevant cognitive responses. *Journal of*

- Personality and Social Psychology*, 37(10), 1915-1926. Doi: 10.1037/0022-3514.10.1915.
- Petty, R.E., & Cacioppo, J.T. (1986). The elaboration likelihood model of persuasion. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology*, (Vol. 19, pp. 123-205). New York: Academic Press.
- Petty, R.E., & Cacioppo, J.T. (1996). Addressing disturbing and disturbed consumer behavior: Is it necessary to change the way we conduct behavioral science? *Journal of Marketing Research*, 33(1), 1-8.
- Petty, R.E., Cacioppo, J.T., & Schumann, D. (1983). Central and peripheral routes to advertising effectiveness: The moderating role of involvement. *Journal of Consumer Research*, 10(2), 135-146. Doi: 10.1086/208954.
- Petty, R.E., Haugtvedt, C., & Smith, S.M. (1995). Elaboration as a determinant of attitude strength: Creating attitudes that are persistent, resistant, and predictive of behavior. In R.E. Petty & J.A. Krosnick (Eds.), *Attitude strength: Antecedents and consequences* (pp. 93-130). Mahwah, NJ: Erlbaum Associates.
- Petty, R.E., & Krosnick, J.A. (Eds.) (1995). *Attitude strength: Antecedents and consequences*. Mahwah, NJ: Erlbaum Associates.
- Petty, R.E., Tormala, Z.L., Hawkins, C., & Wegener, D.T. (2001). Motivation to think and order effects in persuasion: The moderating role of chunking. *Personality and Social Psychology Bulletin*, 27(3), 332-344. Doi: 10.1177/0146167201273007.

- Petty, R. E., & Wegener, D. T. (1999). The Elaboration Likelihood Model: Current status and controversies. In S. Chaiken & Y. Trope (Eds.), *Dual process theories in social psychology* (pp. 41-72). New York: Guilford Press.
- Priester, J.R., & Petty, R.E. (2003). The influence of spokesperson trustworthiness on message elaboration, attitude strength, and advertising effectiveness. *Journal of Consumer Psychology, 13*(4), 408-421.
- Sheeran, P., Gollwitzer, P.M., & Bargh, J.A. (2013). Nonconscious processes and health. *Health Psychology, 32*(5), 460-473. Doi: 10.1037/a0029203.
- Sherman, J.W., Gawronski, B., & Trope, Y. (2014). *Dual-process theories of the social mind*. New York, NY: Guilford Press.
- Shiv, B., & Fedorikhin, A. (1999). Heart and mind in conflict: The interplay of affect and cognition in consumer decision making. *Journal of Consumer Research, 26*(3), 278-292. Doi: 10.1086/209563.
- Shiv, B., & Fedorikhin, A. (2002). Spontaneous versus controlled influences of stimulus-based affect on choice behavior. *Organizational Behavior and Human Decision Processes, 87*(2), 342-370. Doi: 10.1006/obhd.2001.2977.
- Sivacek, J., & Crano, W.D. (1982). Vested interest as a moderator of attitude-behavior consistency. *Journal of Personality and Social Psychology, 43*(2), 210-221. Doi: 10.1037/0022-3514.43.2.210.
- Strack, F., & Deutsch, R. (2004). Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review, 8*(3), 220-247. Doi: 10.1207/s15327957pspr0803\_1.

- Tormala, Z.L. & Petty, R.E. (2002). What doesn't kill me makes me stronger: The effects of resisting persuasion on attitude certainty. *Journal of Personality and Social Psychology*, 83(6), 1298-1313. Doi: 10.1037/0022-3514.83.6.1298.
- Trope, Y. & Fishbach, A. (2005). Going beyond the motivation given: Self-control and situational control over behavior. In R.R. Hassin, J. Uleman, & J.A. Bargh (Eds.) *The new unconscious* (pp. 537-565). New York: Oxford University Press.
- Wegener, D.T., Petty, R.E., Dove, N.L., & Fabrigar, L.R. (2004). Multiple routes to resisting attitude change. In E.S. Knowles & J.A. Linn (Eds.), *Resistance and persuasion* (pp. 13-38). Mahwah, NJ: Erlbaum Associates.
- Wood, W., Labrecque, J., Lin, P-Y., Ruenger, D. (In press). Habits in dual process models. In J. Sherman, B. Gawronski, & Y. Trope (Eds.), *Dual process theories of the social mind*. New York, NY: Guilford Press.
- Young, A. & Fazio, R.H. (2013). Attitude accessibility as a determinant of object construal and evaluation. *Journal of Experimental Social Psychology*, 49(3), 404-418. Doi: 10.1016/j.jesp.2012.12.009.

## Appendix A: Persuasive Messages

### **Strong Anti-Chocolate Message**

*Chocolate is BAD!*

Chocolate is a sweet food developed from the cocoa bean and has roots in the Central Americas for as many as 2,000 years. Recently, research has shown that chocolate is known to have several consequences.

Some reasons why chocolate is bad for you include:

- The cocoa bean contains caffeine, which can result in multiple negative health side effects.
- The sugar in chocolate can actually suppress the immune system.
- Chocolate may be addictive because of the release of dopamine in the brain.
- Foods with chocolate are often high in saturated and trans fat.
- Foods that contain chocolate often have high calorie contents.

### **Strong Pro-Chocolate Message**

*Chocolate is GOOD!*

Chocolate is a sweet food developed from the cocoa bean and has roots in the Central Americas for as many as 2,000 years. Recently, research has shown that chocolate is known to have several benefits.

Some reasons why chocolate is good for you include:

- The cocoa bean contains tryptophan, which can result in decreased anxiety.
- The sugar in chocolate can actually provide more energy.
- Chocolate may elevate mood because of the release of endorphins in the brain.
- Foods with chocolate are often sweet and pleasant.
- Foods that contain chocolate are often richer in taste.

### **Weak Anti-Chocolate Message**

*Chocolate is BAD!*

Chocolate is a sweet food developed from the cocoa bean and has roots in the Central Americas for as many as 2,000 years. Recently, research has shown that chocolate is known to have several consequences.

Some reasons why chocolate is bad for you include:

- The cocoa bean contains caffeine, which can result in staying awake late into the evening.
- Chocolate may suppress the immune system because it excites the white blood cells, which makes them tired and less effective.
- People often eat too much chocolate and become addicted to it.
- Foods with chocolate are often difficult to eat because they are so rich in flavor.
- Chocolate is often messy when you eat it because it melts in your hands.

### **Weak Pro-Chocolate Message**

*Chocolate is GOOD!*

Chocolate is a sweet food developed from the cocoa bean and has roots in the Central Americas for as many as 2,000 years. Recently, research has shown that chocolate is known to have several benefits.

Some reasons why chocolate is good for you include:

- Foods that contain chocolate are often richer in taste, which makes it difficult to eat a full portion.
- The cocoa bean contains tryptophan, which makes you sleepy so you get more rest and feel energized sooner.
- Foods with chocolate are easy to consume because you can easily purchase them from vending machines.
- Foods with chocolate have been altered so they don't melt in your hand.
- Chocolate can reduce the symptoms of premenstrual syndrome (PMS)



## Appendix B: Figures

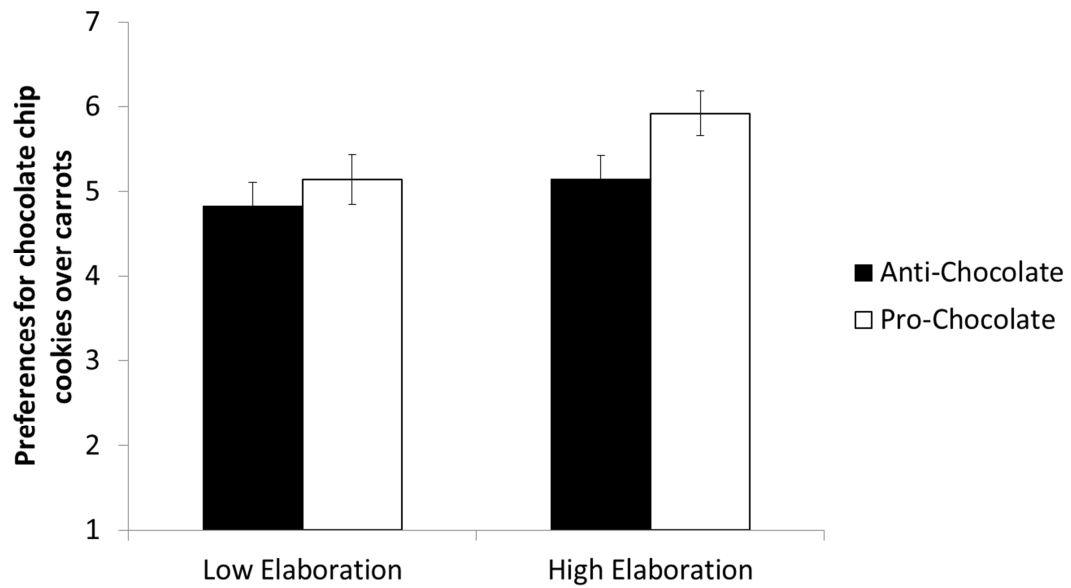


Figure 1. Preferences as a function of elaboration and message in Study 1. Error bars represent standard error of the mean.

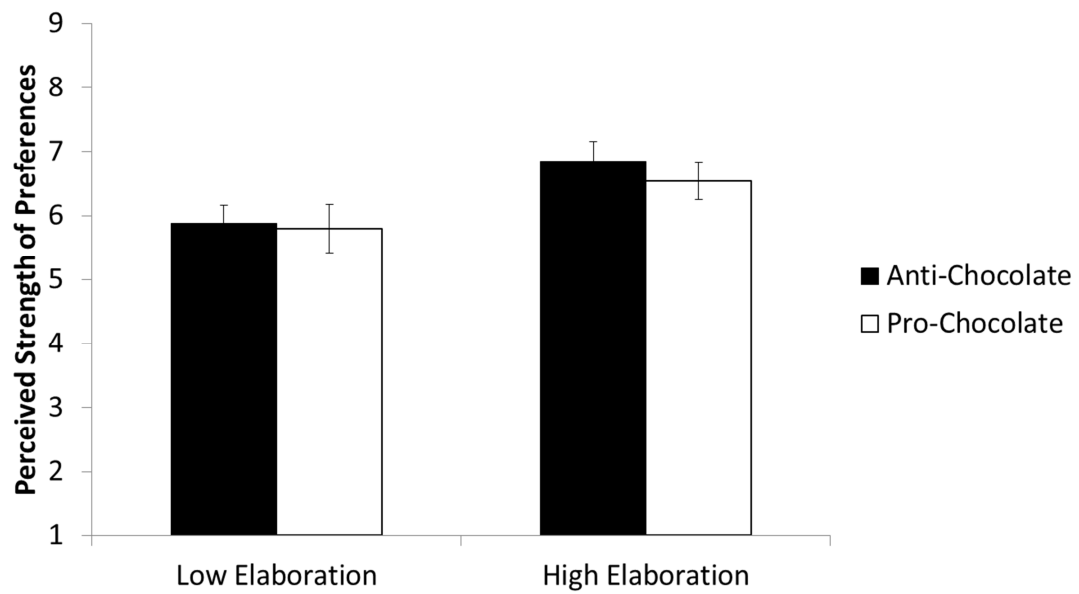


Figure 2. Perceived strength (i.e., resistance to change and certainty) of preferences as a function of elaboration and message in Study 1. Error bars represent standard error of the mean.

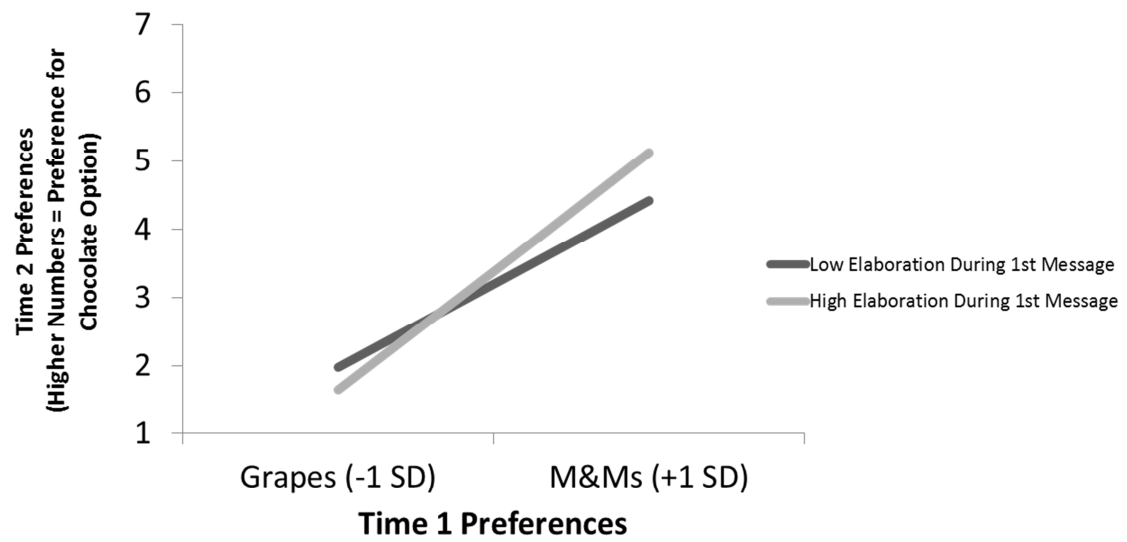


Figure 3. Subsequent preferences as a function of initial preferences and elaboration in Study 2.

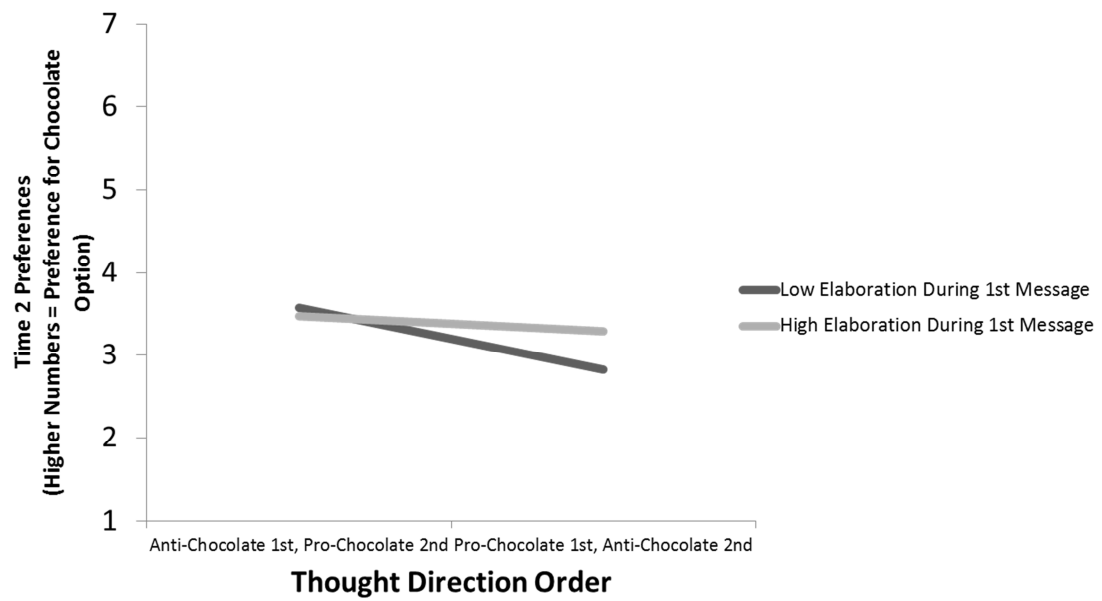


Figure 4. Subsequent preferences as a function of elaboration and thought direction order in Study 2.

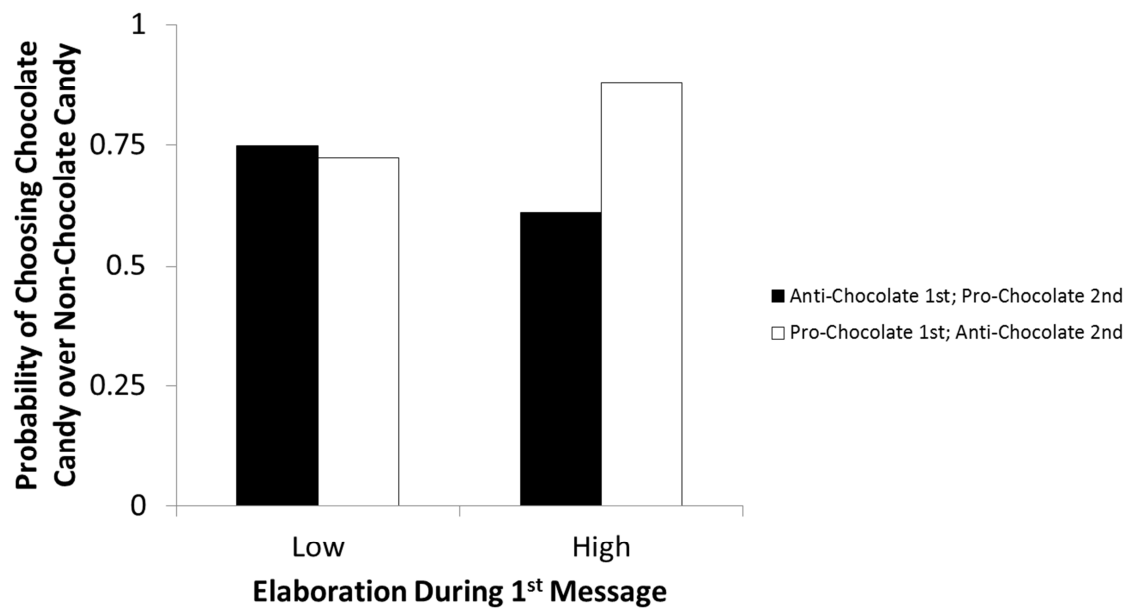


Figure 5. Candy choice as a function of elaboration and thought direction order in Study 3.

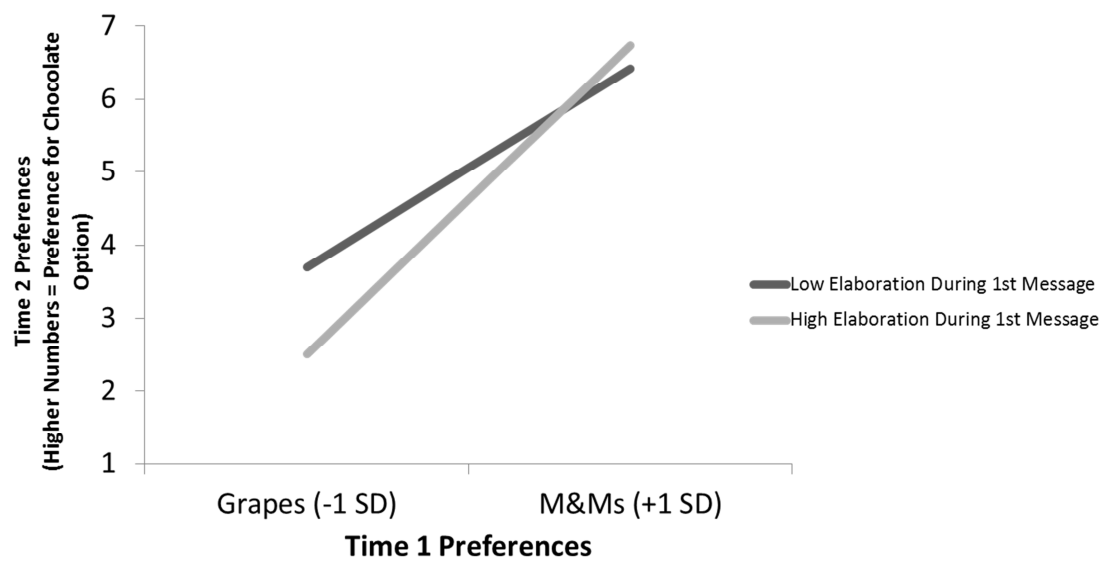


Figure 6. Subsequent preferences as a function of elaboration and thought direction order in Study 4.

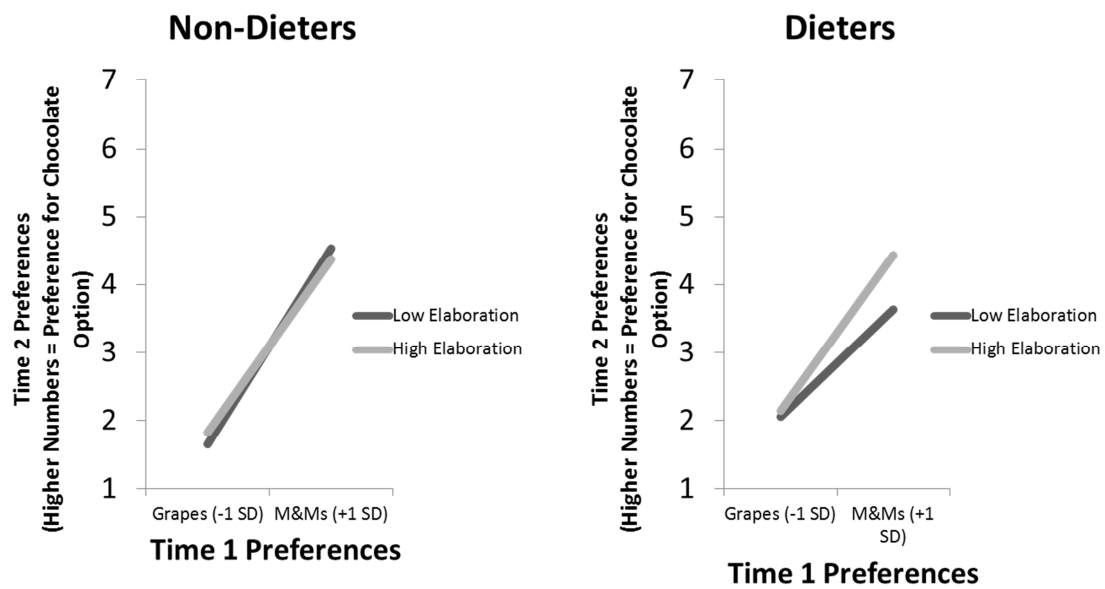


Figure 7. Subsequent preferences as a function of initial preferences, elaboration, and relevance in Study 4.

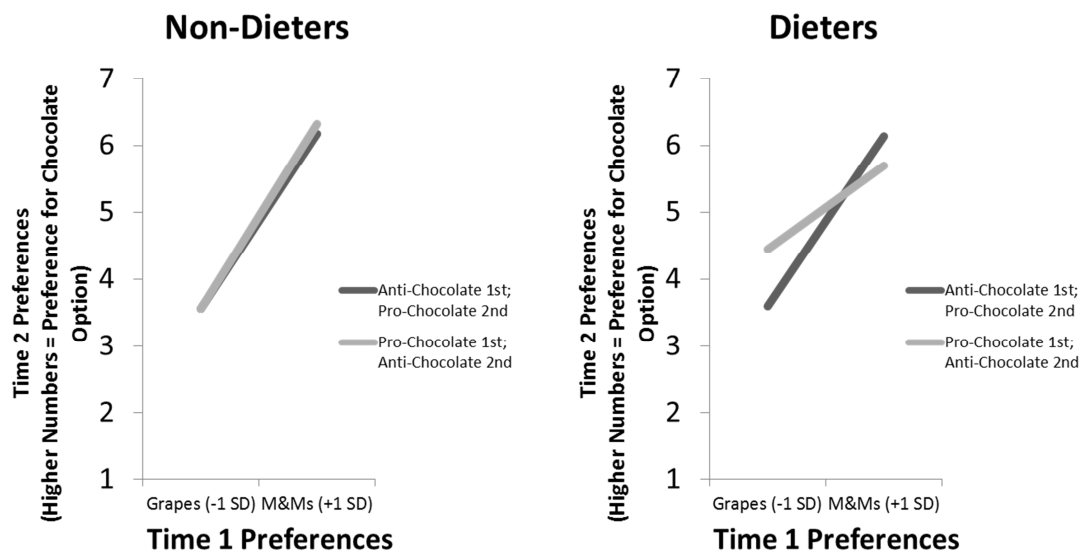


Figure 8. Subsequent preferences as a function of elaboration, thought direction order, and relevance in Study 4.



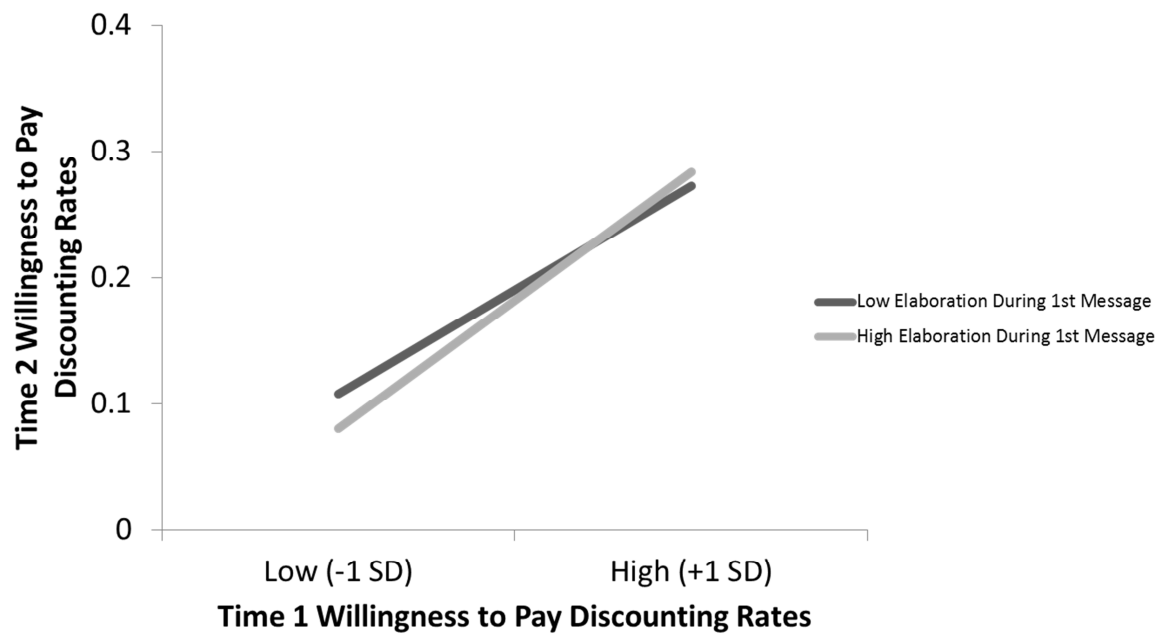


Figure 9. Subsequent preferences as a function of initial preferences and elaboration in Study 5.

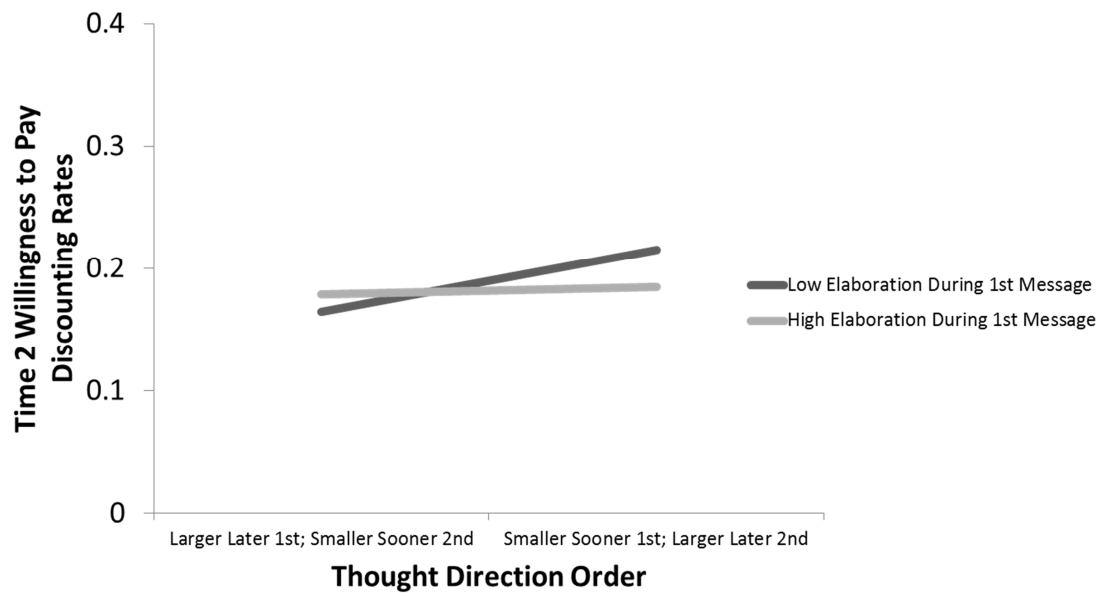


Figure 10. Subsequent preferences as a function of elaboration and thought direction order in Study 5.

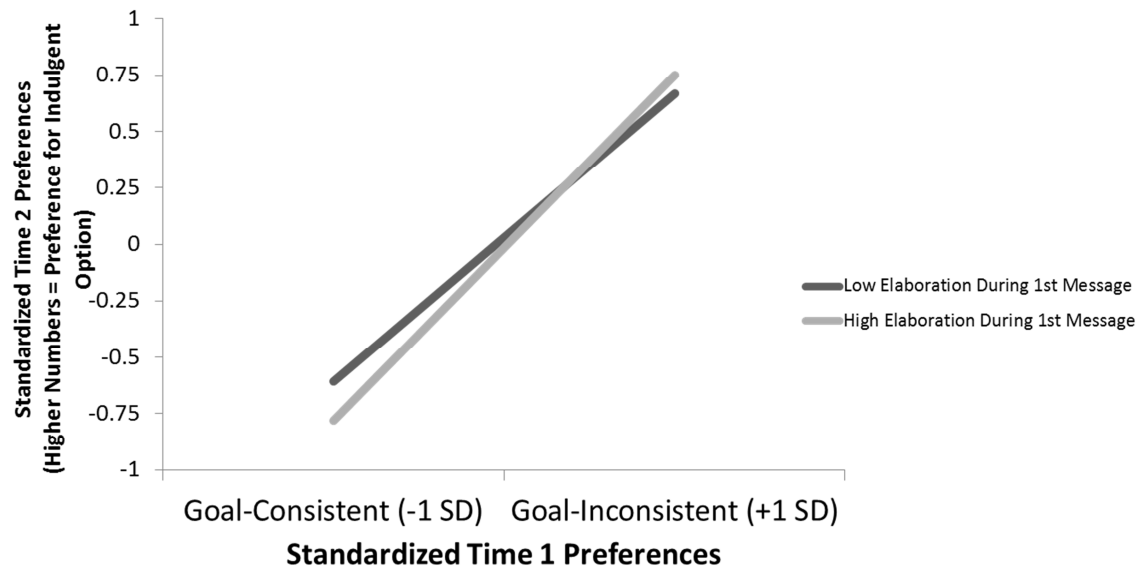


Figure 11. Subsequent preferences as a function of initial preferences and elaboration in Studies 2, 4, and 5.

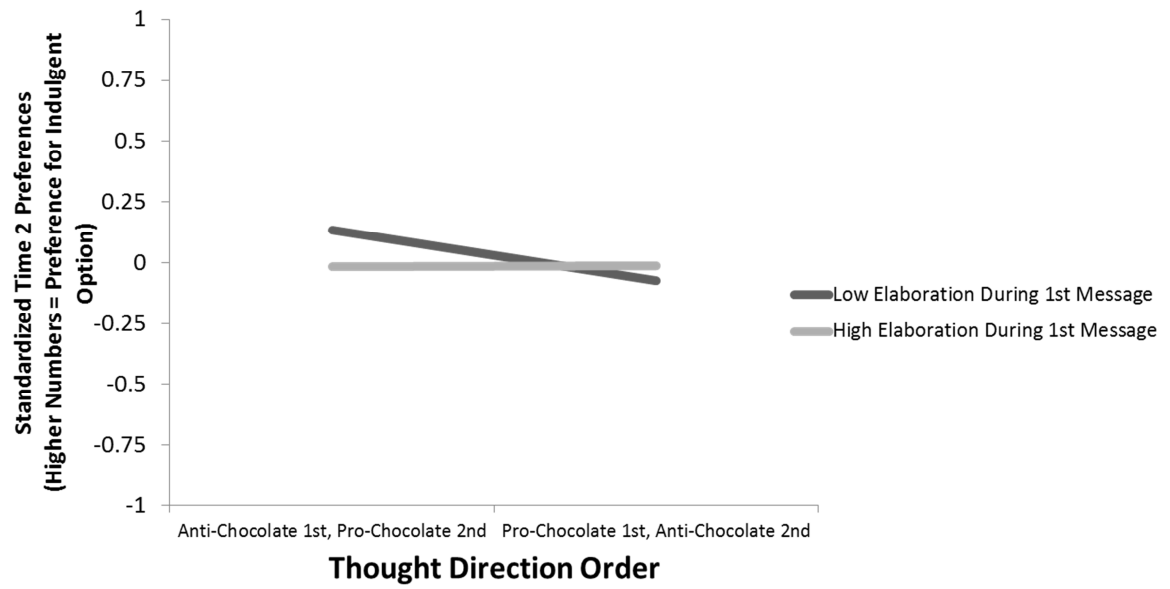


Figure 12. Subsequent preferences as a function of elaboration and thought direction order in Studies 2, 4, and 5.

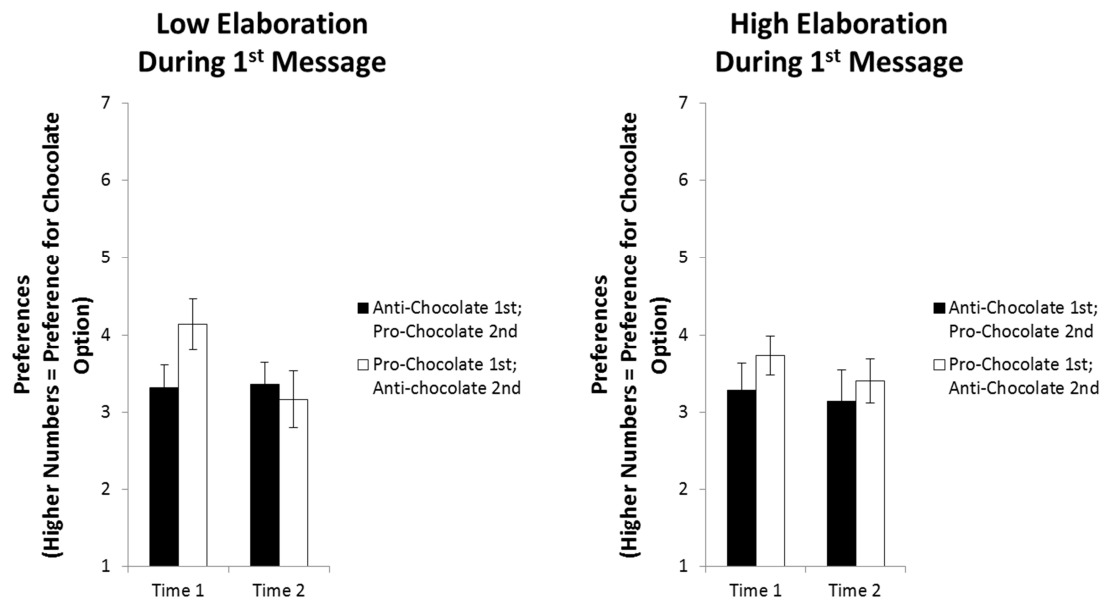


Figure 13. Preferences as a function of elaboration, thought direction order, and time of measurement in Study 2.

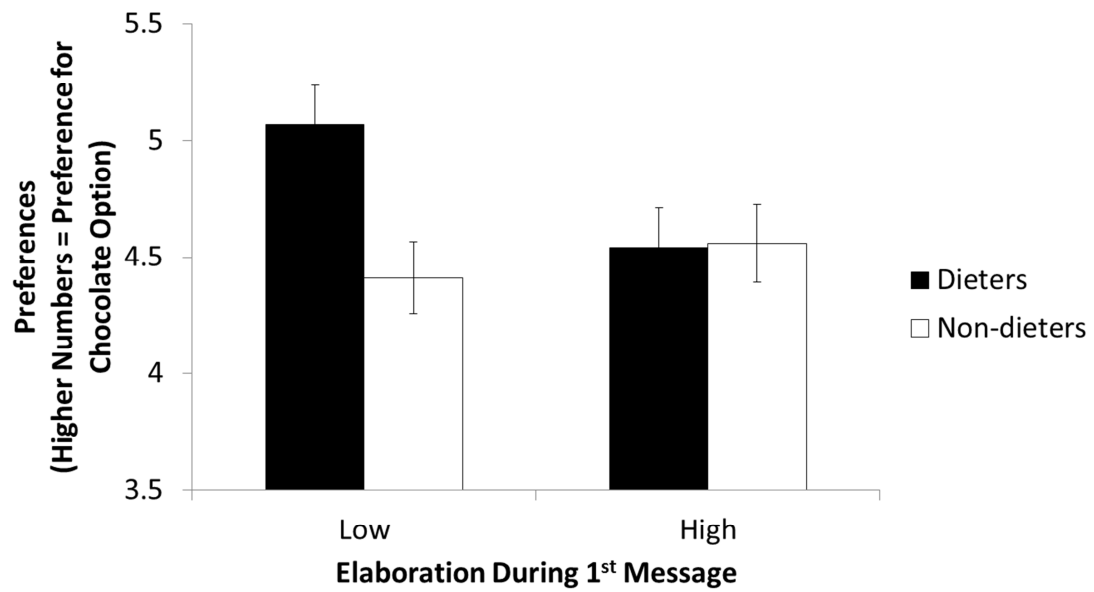


Figure 14. Average preferences over time as a function of elaboration and relevance in Study 4.

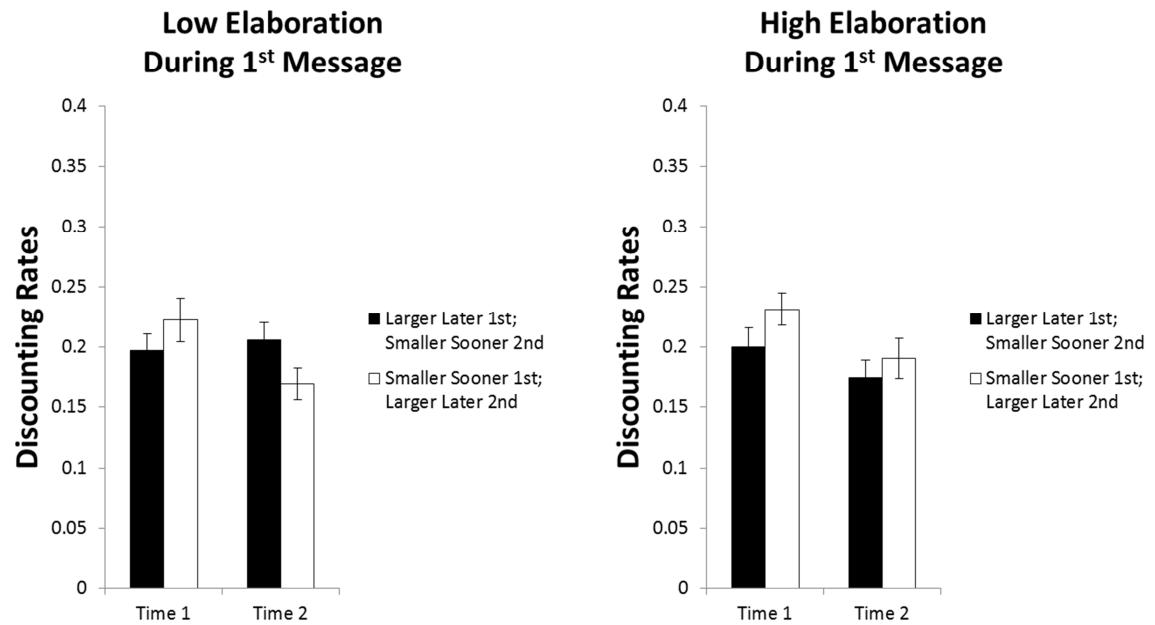


Figure 15. Preferences as a function of elaboration, thought direction order, and time of measurement in Study 5.

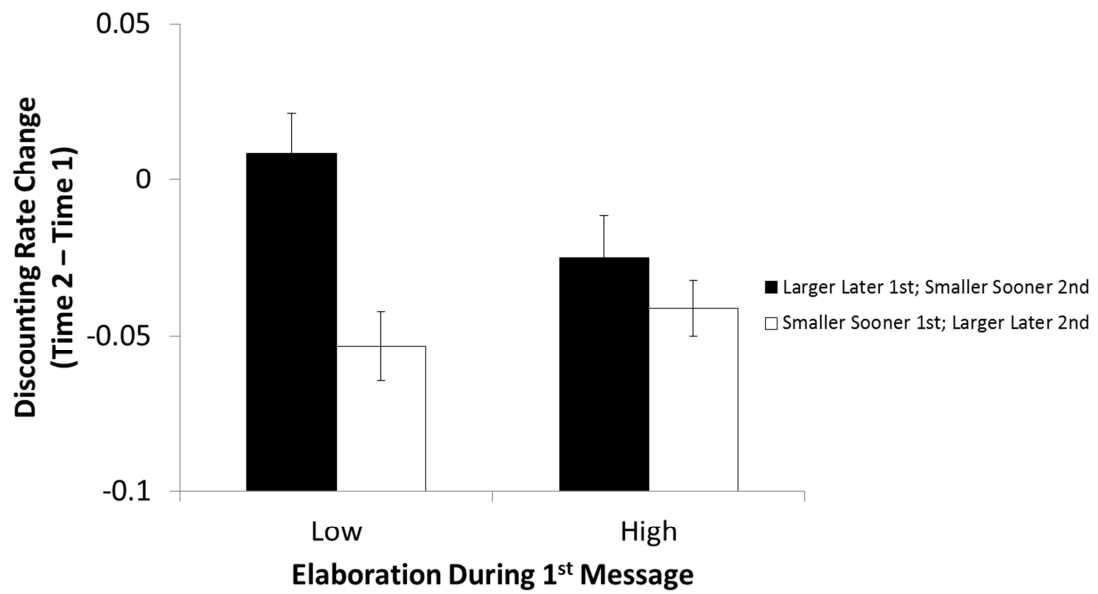


Figure 16. Preference change as a function of elaboration and thought direction order in Study 5.



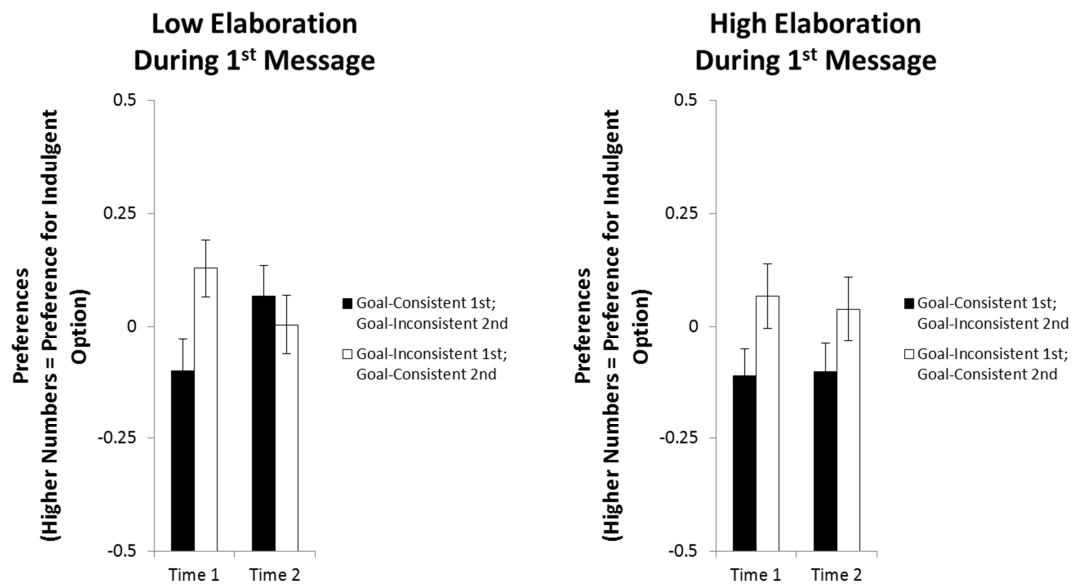


Figure 17. Preferences as a function of elaboration, thought direction order, and time of measurement in Studies 2, 4, and 5.

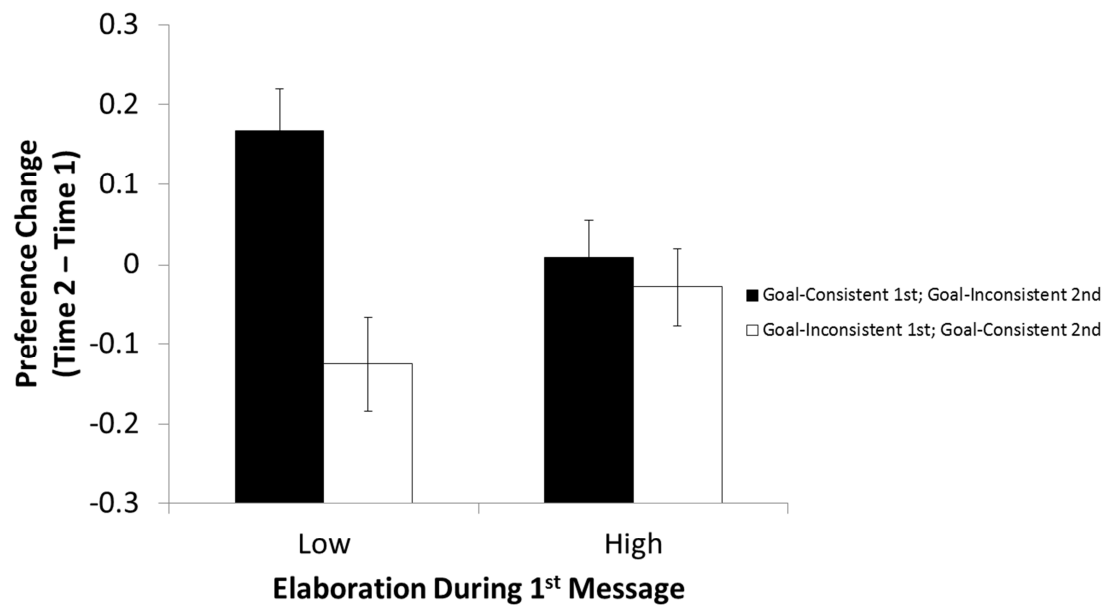


Figure 18. Preference change as a function of elaboration and thought direction order in Studies 2, 4, and 5.

## Appendix C: Study 2 Supplementary Analyses

As denoted in the footnote for Study 2, there are three ways to analyze resistance to change hypotheses in persuasion studies: (1) regress time 2 preferences on time 1 preferences and the independent variables of interest, (2) conduct a mixed model ANOVA with time of measurement as a within subject variable, or (3) examine the change (i.e., difference score) between preferences over time using an ANOVA. The results of the first approach are reported in the manuscript. The results for the remaining analytical strategies for studies testing objective resistance to change (i.e., Studies 2, 4, & 5) are reported in the relevant appendices.

*Mixed Model ANOVA.* A 2 (elaboration: low vs. high) x 2 (message: anti-chocolate vs. pro-chocolate) x 2 (time of measurement) mixed model ANOVA on participants' preferences between grapes and M&Ms in Study 2 was conducted. On average, participants wanted the M&Ms more than the grapes at Time 1 ( $M = 3.62$ ,  $SD = 1.72$ ) than at Time 2 ( $M = 3.25$ ,  $SD = 1.87$ ),  $F(1, 130) = 11.35$ ,  $p = .001$ ,  $d = .28$ . This trend was qualified by message order,  $F(1, 130) = 8.37$ ,  $p = .004$ ,  $\eta^2_{\text{partial}} = .06$ . Participants who read the pro-chocolate message first ( $M = 3.95$ ,  $SD = 1.84$ ) wanted the M&Ms more than the grapes significantly more than those who read the anti-chocolate message first ( $M = 3.29$ ,  $SD = 1.78$ ) at Time 1,  $F(1, 130) = 4.19$ ,  $p = .04$ ,  $\eta^2_{\text{partial}} = .03$ , but not at Time 2,  $F(1, 130) = 0.01$ ,  $p = .92$ ,  $\eta^2_{\text{partial}} = .00$ . This pattern suggests that the

manipulation of direction of thoughts was effective for all participants at Time 1, regardless of elaboration.

Most importantly, the predicted 3-way interaction of elaboration, message order, and time of measurement was reliable,  $F(1, 130) = 3.85, p = .05, \eta_{partial}^2 = .03$  (see Figure 13). This interaction was decomposed as a function of elaboration. As predicted, preferences did not significantly differ as a joint function of message and time for participants in the high elaboration condition,  $F(1, 72) = 0.70, p = .41, \eta_{partial}^2 = .01$ . However, message order and time of measurement jointly influenced preferences for those in the low elaboration condition,  $F(1, 59) = 7.83, p = .007, \eta_{partial}^2 = .12$ . Participants who read the pro-chocolate message first ( $M = 4.14, SD = 1.76$ ) had more favorable preferences relative to those who read the anti-chocolate message first ( $M = 3.32, SD = 1.65$ ) at Time 1,  $F(1, 59) = 3.36, p = .07, d = .23$ , but not at Time 2,  $F(1, 59) = 0.18, p = .67, d = .05$ . The interaction of message order and time of measurement for those in the low elaboration condition but not the high elaboration condition as hypothesized suggests that preferences were more resistant to change in the high elaboration condition than in the low elaboration condition.

*Difference Score.* As an additional objective measure of change, participants' initial preferences were subtracted from their subsequent preferences. A 2 (elaboration: low vs. high) x 2 (message: anti-chocolate first vs. pro-chocolate first) between participants ANOVA was then conducted on this difference score. Overall, participants' preferences became more negative for those in the pro-chocolate first condition ( $M = -.68, SD = 1.28$ ) than the anti-chocolate first condition ( $M = -.07, SD = 1.11$ ),  $F(1, 130) =$

8.37,  $p = .004$ ,  $d = .25$ . This effect was qualified by elaboration,  $F(1, 130) = 3.85$ ,  $p = .05$ ,  $\eta^2_{\text{partial}} = .03$ . For those in the high elaboration condition, message order did not significantly affect preference change,  $F(1, 71) = 0.70$ ,  $p = .41$ ,  $d = .10$ . However, message order significantly influenced preference change for those in the low elaboration condition,  $F(1, 59) = 7.83$ ,  $p = .007$ ,  $d = .34$ , such that participants' preferences became more negative when they first read the pro-chocolate message ( $M = -.97$ ,  $SD = 1.34$ ) relative to the anti-chocolate message ( $M = .04$ ,  $SD = 1.46$ ).

While these results suggest that participants' preferences change in the direction of the attack message, a conceptually similar way of analyzing the same data is to examine the absolute value of this change score. If elaboration increases resistance to change, those in the low elaboration condition should have a higher absolute value of the difference score than those in the high elaboration condition. Our results are consistent with these analyses. Specifically, participants in the high elaboration condition ( $M = .63$ ,  $SD = .77$ ) showed significantly less change over time than those in the low elaboration condition ( $M = 1.02$ ,  $SD = 1.19$ ),  $F(1, 133) = 4.17$ ,  $p = .04$ ,  $d = .17$ . The main effect of thought direction order and its interaction with elaboration were nonsignificant,  $F(1, 133) = .94$ ,  $p = .33$ ,  $d = .08$  and  $F(1, 133) = .00$ ,  $p = .97$ ,  $\eta^2_{\text{partial}} = .00$ .

#### Appendix D: Study 4 Supplementary Analyses

*Mixed Model ANOVA.* A 2 (elaboration: low vs. high) x 2 (message: anti-chocolate first vs. pro-chocolate first) x 2 (relevance: dieters vs. non-dieters) x 2 (time of measurement) mixed model ANOVA on participants' choices between grapes and M&Ms was conducted. On average, dieters ( $M = 3.51$ ,  $SD = 1.68$ ) wanted the M&Ms more than non-dieters ( $M = 3.19$ ,  $SD = 1.62$ ),  $F(1, 385) = 4.08$ ,  $p = .04$ ,  $d = .10$ , which is consistent with previous research on food-related desires among restrained eaters. This pattern was qualified by an interaction with elaboration,  $F(1, 385) = 4.33$ ,  $p = .04$ ,  $\eta^2_{\text{partial}} = .01$  (see Figure 14), such that dieters ( $M = 3.59$ ,  $SD = 1.60$ ) wanted M&Ms more than grapes compared to non-dieters ( $M = 2.94$ ,  $SD = 1.58$ ) in the low elaboration condition,  $F(1, 191) = 8.96$ ,  $p = .003$ ,  $d = .21$ , but not for those in the high elaboration condition,  $F(1, 194) = 0.00$ ,  $p = .97$ ,  $d = .00$ . Contrary to our core hypothesis, there was no three-way interaction of time of measurement, elaboration, and direction,  $F(1, 385) = 0.55$ ,  $p = .46$ ,  $\eta^2_{\text{partial}} = .001$ , nor the four-way interaction of time of measurement, elaboration, direction, and relevance,  $F(1, 385) = 0.64$ ,  $p = .43$ ,  $\eta^2_{\text{partial}} = .002$ .

*Difference Score.* As an additional objective measure of change, participants' initial preferences were subtracted from their subsequent preferences. A 2 (elaboration: low vs. high) x 2 (thought direction order: anti-chocolate first vs. pro-chocolate first) between participants ANOVA was then conducted on this difference score. Contrary to

our hypotheses, none of the effects were statistically reliable (all  $ps > .32$ ). A conceptually similar analysis examining the absolute value of the difference score was also conducted. While the main effects of elaboration and relevance were not significant,  $F(1, 385) = .06, p = .81, d = .01$  and  $F(1, 385) = 1.70, p = .19, d = .07$ , respectively, their interaction was marginally significant,  $F(1, 385) = 3.26, p = .07, \eta^2_{\text{partial}} = .01$ . When decomposed as a function of relevance, the main effect of elaboration was not significant for neither dieters nor non-dieters,  $F(1, 173) = 1.56, p = .21, d = .09$  and  $F(1, 212) = 1.66, p = .20, d = .09$ , respectively. However, when decomposed as a function of elaboration, relevance did not significantly influence preference change for those in the high elaboration condition,  $F(1, 194) = .13, p = .72, d = .03$ . For those in the low elaboration condition, however, relevance significantly influenced preference change,  $F(1, 191) = 4.74, p = .03, d = .16$ , such that dieters ( $M = 1.12, SD = 1.28$ ) showed more change than non-dieters ( $M = .78, SD = .84$ ).

## Appendix E: Study 5 Supplementary Analyses

*Mixed Model ANOVA.* A 2 (elaboration: low vs. high) x 2 (thought direction order: smaller sooner first vs. larger later first) x 2 (time of measurement) mixed model ANOVA on participants' WTP was conducted. In general, participants had higher WTP initially ( $M = .21$ ,  $SD = .15$ ) relative to subsequent WTP ( $M = .18$ ,  $SD = .13$ ),  $F(1, 367) = 23.40$ ,  $p < .001$ ,  $d = .24$ . However, this pattern was qualified by direction,  $F(1, 367) = 11.59$ ,  $p = .001$ ,  $\eta^2_{partial} = .03$ . Discounting rates changed significantly over time for participants who first generated reasons to take the smaller amount of money sooner ( $M_{Time 1} = 0.23$ ,  $SD_{Time 1} = .15$ ;  $M_{Time 2} = 0.18$ ,  $SD_{Time 2} = .14$ ),  $F(1, 189) = 32.48$ ,  $p < .001$ ,  $d = .38$ , but not for those who first generated reasons to take the larger amount later,  $F(1, 178) = 1.09$ ,  $p = .30$ ,  $d = .08$ . This pattern was, as predicted, further qualified by elaboration,  $F(1, 367) = 3.96$ ,  $p = .05$ ,  $\eta^2_{partial} = .01$  (see Figure 15). In the high elaboration condition, there was no significant interaction of thought direction and time of measurement,  $F(1, 189) = 1.61$ ,  $p = .21$ ,  $\eta^2_{partial} = .01$ . However, thought direction and time of measurement jointly influenced discounting rates for participants in the low elaboration condition,  $F(1, 178) = 11.25$ ,  $p = .001$ ,  $\eta^2_{partial} = .06$ . In the low elaboration condition, thought direction did not influence discounting rates at Time 1,  $F(1, 179) = 1.59$ ,  $p = .21$ ,  $d = .09$ , but it did influence discounting rates at Time 2,  $F(1, 178) = 3.47$ ,  $p = .06$ ,  $d = .14$ . Participants in this condition who initially listed reasons to take the larger



amount later, and thus had just listed reasons to take the smaller amount sooner, had higher discounting rates ( $M = 0.21$ ,  $SD = .12$ ) than those who initially listed reasons to take the smaller amount sooner ( $M = .17$ ,  $SD = .14$ ). This pattern of results shows that participants' discounting rates changed as a function of their thoughts over time for those in the low elaboration condition but not those in the high elaboration condition. Thus, elaborating on thoughts about a financial conflict (e.g., taking a smaller amount of money now versus a larger amount later or vice versa) makes one's preferences in this choice stronger and therefore influences how much participants would be willing to pay.

*Difference Score.* As an additional objective measure of change, participants' initial WTP was subtracted from their subsequent WTP. A 2 (elaboration: low vs. high) x 2 (thought direction order: smaller sooner first vs. larger later first) between participants ANOVA was then conducted on this difference score. Participants in the smaller sooner first condition ( $M = -.05$ ,  $SD = .11$ ) showed a larger decrease than those in the larger later first condition ( $M = -.01$ ,  $SD = .11$ ),  $F(1, 367) = 11.59$ ,  $p = .001$ ,  $d = .17$ . This pattern was qualified by elaboration,  $F(1, 367) = 3.96$ ,  $p = .05$ ,  $\eta^2_{partial} = .01$  (see Figure 16). For those in the high elaboration condition, thought direction order did not significantly affect WTP change,  $F(1, 189) = 1.36$ ,  $p = .25$ ,  $d = .08$ . However, thought direction order significantly influenced WTP change for those in the low elaboration condition,  $F(1, 178) = 11.25$ ,  $p = .001$ ,  $d = .24$ , such that participants' WTP decreased more over time when they first generated smaller sooner thoughts ( $M = -.05$ ,  $SD = .12$ ) relative to larger later thoughts ( $M = .01$ ,  $SD = .12$ ).

A conceptually similar analysis using the absolute value of the difference score was also conducted. As expected, there was a significant main effect of elaboration,  $F(1, 367) = 3.85, p = .05, d = .10$ , such that those in the high elaboration condition ( $M = .07, SD = .08$ ) showed less change than those in the low elaboration condition ( $M = .08, SD = .10$ ). The effects of thought direction order and its interaction with elaboration were nonsignificant,  $F(1, 367) = 2.57, p = .11, d = .08$  and  $F(1, 367) = .01, p = .91, \eta^2_{partial} = .00$ .<sup>17</sup>

---

<sup>17</sup> Although not significant, those who generated larger later thoughts first ( $M = .07, SD = .08$ ) showed less change than those who generated smaller sooner thoughts first ( $M = .08, SD = .09$ ).

## Appendix F: Combined Studies 2, 4, & 5 Supplementary Analyses

*Mixed Model ANOVA.* A 2 (elaboration: low vs. high) x 2 (thought direction order: goal-consistent vs. goal-inconsistent) x 2 (time of measurement: initial vs. subsequent preferences) x 2 (study: classic persuasion vs. self-persuasion) mixed model ANOVA on participants' preferences between grapes and M&Ms was conducted. There emerged a significant main effect of thought direction order on participants' preferences,  $F(1, 890) = 2.86, p = .09, d = .11$ , such that those who generated goal-inconsistent thoughts ( $M = .06, SD = 1.01$ ) were more likely to prefer the indulgent option compared to those who generated goal-consistent thoughts ( $M = -.06, SD = .98$ ). This effect was qualified by time of measurement,  $F(1, 890) = 10.25, p = .001, \eta^2_{partial} = .01$ . As expected, participants' initial preferences reflected the direction of their initial thoughts,  $F(1, 892) = 8.13, p = .004, d = .19$ , such that those who had goal-inconsistent thoughts ( $M = .11, SD = 1.01$ ) preferred the indulgent option more than those who generated goal-consistent thoughts ( $M = -.11, SD = .97$ ). Subsequent preferences, however, were not influenced by initial thought direction,  $F(1, 890) = 0.10, p = .75, d = .02$ .

Furthermore, the expected 3-way interaction of elaboration, direction, and time of measurement emerged,  $F(1, 890) = 5.28, p = .02, \eta^2_{partial} = .01$  (see Figure 17). Among participants in the high elaboration condition, there was a nonsignificant trend of thought direction order,  $F(1, 458) = 2.05, p = .15, d = .13$ , such that participants who first

generated goal-inconsistent thoughts ( $M = .05$ ,  $SD = 1.07$ ) preferred the indulgent option more than those who first generated goal-consistent thoughts ( $M = -.11$ ,  $SD = .94$ ). That this effect was not qualified by time of measurement,  $F(1, 458) = .51$ ,  $p = .49$ ,  $\eta^2_{\text{partial}} = .001$ , indicates that these preferences were resistant to change. For participants in the low elaboration condition, however, there was no simple main effect of thought direction order,  $F(1, 432) = .95$ ,  $p = .33$ ,  $d = .09$ , but there was a significant thought direction order by time of measurement interaction,  $F(1, 430) = 12.18$ ,  $p < .001$ ,  $\eta^2_{\text{partial}} = .03$ . As expected, although participants who initially generated goal-inconsistent thoughts preferred indulgence more at Time 1 ( $M = .14$ ,  $SD = .95$ ) than those who generated goal-consistent thoughts ( $M = -.10$ ,  $SD = 1.03$ ),  $F(1, 433) = 5.58$ ,  $p = .02$ ,  $d = .23$ , this effect did not persist at Time 2,  $F(1, 432) = .34$ ,  $p = .56$ ,  $d = .06$ .

*Difference Score.* As an additional objective measure of change, participants' initial preferences were subtracted from their subsequent preferences. A 2 (elaboration: low vs. high) x 2 (thought direction order: goal-inconsistent first vs. goal-consistent first) x 2 (study: classic persuasion vs. self-persuasion) between participants ANOVA was then conducted on this difference score. Participants in the goal-consistent first conditions ( $M = .08$ ,  $SD = .74$ ) favored indulgence more over time than those in the goal-inconsistent first condition ( $M = -.08$ ,  $SD = .81$ ),  $F(1, 890) = 10.25$ ,  $p = .001$ ,  $d = .21$ . That is, participants in the goal-consistent first condition became significantly more favorable towards indulgence in the face of an attack message than those in the goal-inconsistent first condition. This effect was qualified by elaboration,  $F(1, 890) = 5.28$ ,  $p = .02$ ,  $\eta^2_{\text{partial}} = .01$ . Thought direction order significantly influenced this difference score for

participants in the low elaboration conditions,  $F(1, 432) = 12.18, p < .001, d = .34$ , but not for those in the high elaboration conditions,  $F(1, 458) = 0.52, p = .47, d = .07$  (see Figure 18).

While these results suggest that participants' preferences changed in the direction of their subsequent thoughts (either self-generated thoughts or those prompted by our manipulation of message), a conceptually similar way of analyzing the same data is to examine the absolute value of this change score. If elaboration increases resistance to change, those in the low elaboration condition should show have a higher difference score than those in the high elaboration condition. Our results are consistent with these analyses. Specifically, participants in the high elaboration conditions ( $M = .51, SD = .50$ ) showed significantly less change over time than those in the low elaboration conditions ( $M = .59, SD = .60$ ),  $F(1, 890) = 4.90, p = .03, d = .15$ . No other effects were significant (all  $ps > .23$ ).